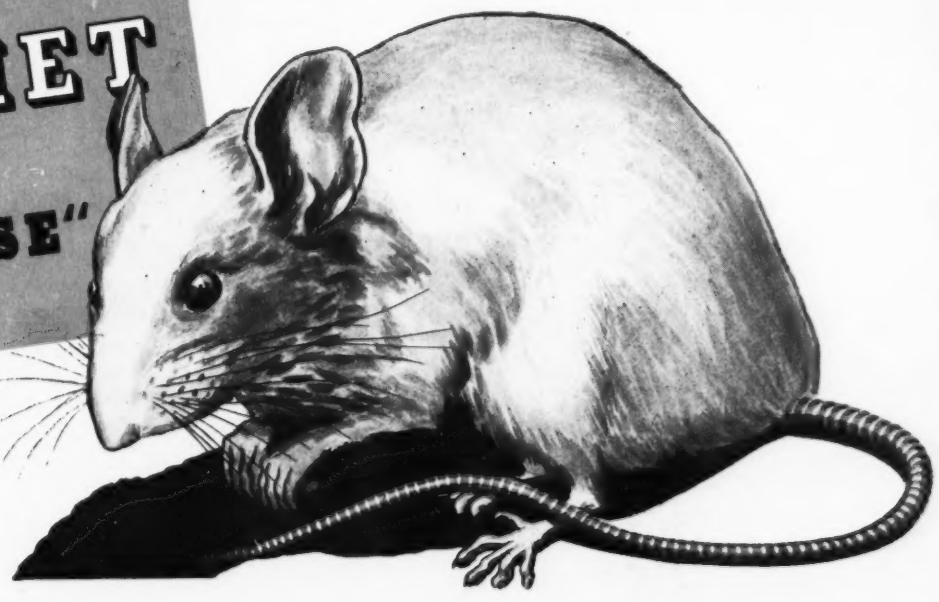
PAPER TRADE JOURNAL

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

"QUIET AS A MOUSE"



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usually high performance at unusu- low costs, with bearings that run "quiet as a mouse," are the trend wherever Tycol Green Cast Greases are used. For Tycol Green Cast is compounded of pure paraffin base cylinder stock oils that need only the very minimum of soap, hence give greater lubrication per pound of lubricant.

Why not cash in on "lubrication engineered to fit the job?" Tide Water's engineering staff will be glad to show you how at no obligation to you.

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TIDE WATER INDUSTRIAL LUBRICANTS

IT IS A COMPLETE LINE OF TYCOL LUBRICANTS SCIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE

SEPT. 8 1938

Vol. CVII
No. 10

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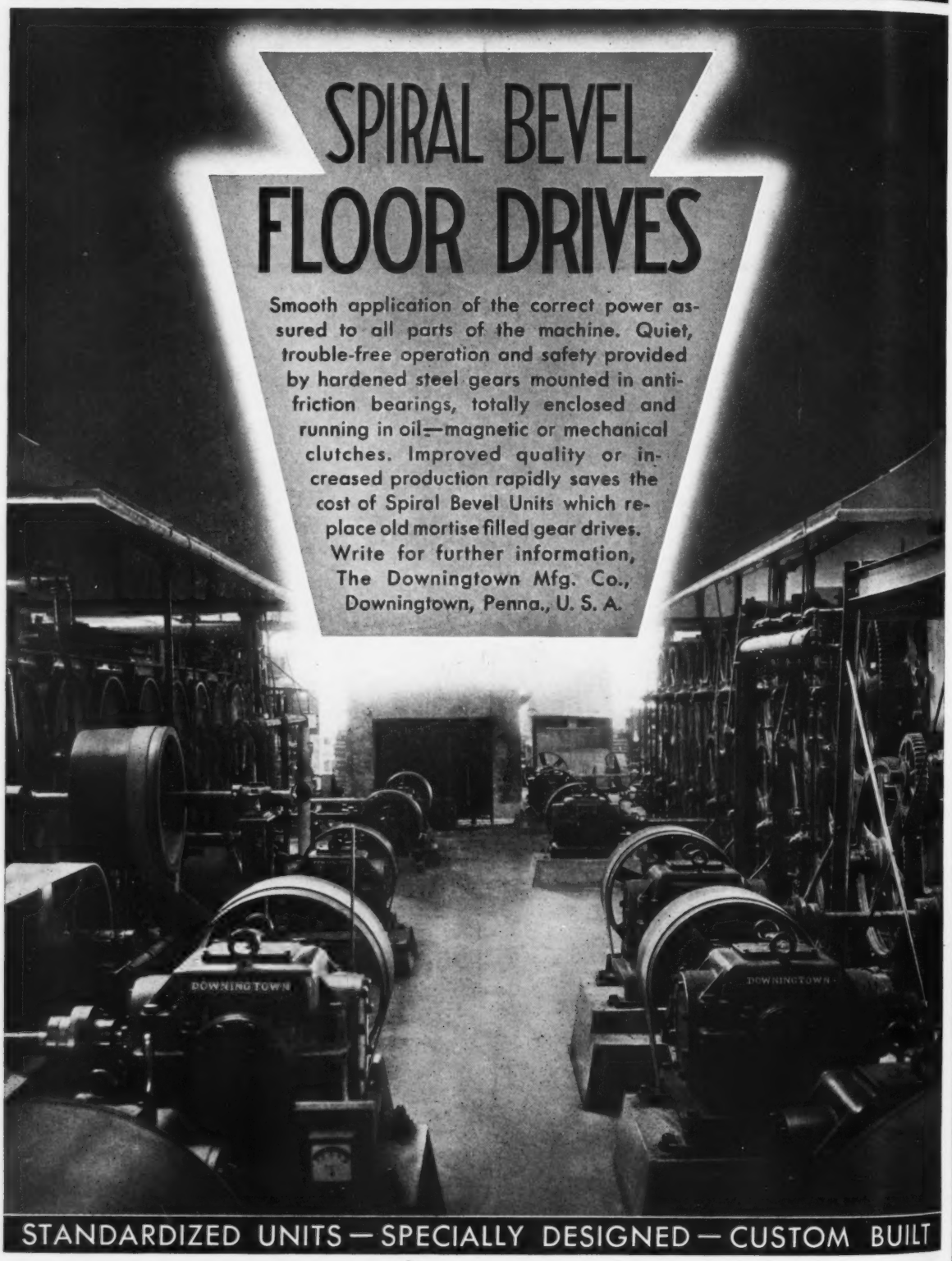
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DOWNINGTOWN
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PAPER TRADE JOURNAL

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

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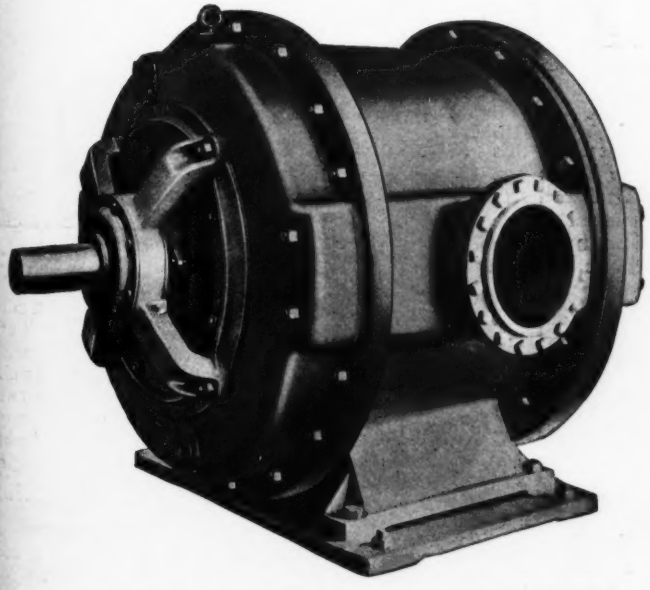
ONLY NASH VACUUM PUMPS HAVE ALL THESE FEATURES.



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No Internal Lubrication
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SIXTY-SEVENTH YEAR
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Established Feb. 17, 1899
Consolidated Nov. 16, 1899
with PAPER TRADE JOURNAL.
Vol. CVII, No. 10 Thursday, September 8, 1938
Established Sept. 21, 1918
Consolidated Feb. 19, 1925
with PAPER TRADE JOURNAL.

Hearings on Wisconsin State Power Project

No Objections Raised At Five Hearings On Proposed $26,000,000 Water Power and Storage Development of Wisconsin and Fox Rivers—Mosinee and Marathon Mills Applications Considered — Other Late Mill News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., September 6, 1938 — Five hearings conducted last week at Wausau, Wis. and other nearby cities produced practically no objections to the proposed $26,000,000 water power and storage development of the Wisconsin and Fox Rivers by the Wisconsin Hydro Authority. The hearings were conducted by Adolph Kannenberg of the Wisconsin Public Service Commission. While applications have been made in the name of paper manufacturers, the project eventually will be handled by the State of Wisconsin through its quasi-public corporation, Wisconsin Hydro Authority.

Glenn Roberts, special counsel for WHA, explained that the hearings were being held now in order to expedite construction if and when the Public Works Administration at Washington grants the necessary funds, and a loan for the sum needed above a federal grant. Permits, licenses and franchises which might be granted to the project owners making application will be turned over to WHA if the grant comes through.

Mosinee Paper Mills Hearing

The first hearing dealt with application of the Mosinee Paper Mills Company, Mosinee, Wis., to rebuild and enlarge its dam. Thomas Utegaard, assistant chief engineer of the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., testified as an expert that the Mosinee development was needed to flood a proposed by-pass or channel to be dug to connect the Wisconsin River with the present Big Eau Pleine reservoir. He placed the cost of raising and extending the dam at $229,000. T. W. Brazeau appeared as attorney for Consolidated.

Marathon Mills Rights Considered

R. E. Puchner, attorney representing the Marathon Paper Mills Company, sought assurance the commission would assure Marathon compensation for reducing power occasioned by raising the water levels between the Mosinee and Marathon dams. It was estimated Marathon would lose power valued at approximately $20,000 a year. Assurance was given by the commission this point would be considered, and that WHA intended to include compensation for the company either in power produced lower down the river or in cash.

Mr. Utegaard also described proposals to build a $1,170,000 open canal from the Wisconsin River to the Big Eau Pleine, and an open cut between the Big and Little Eau Pleine Rivers at a cost of $590,000 in order to provide a by-pass for storage of water in the proposed Little Eau Pleine reservoir. Lands already purchased in the Little Eau Pleine area have cost $268,758, he said, representing about 20,000 acres of the 36,300 required. Thomas Taylor, fieldman, and W. F. Thiele, engineer for Consolidated, also testified, the former saying the average price paid per acre for land for the Big Eau Pleine was $35 per acre.

The proposal also was discussed of metering water passing through the Big Eau Pleine dam as a means of compensating Wisconsin Valley Improvement Company, owners of that dam.

Hearings at Stevens Point

Hearings the third day were moved to Stevens Point, Wis., where Examiner Kannenberg brought up the matter of constructing a dam and hydro-electric plant on the Wisconsin River at Knowlton, Wis. Engineer Utegaard testified the dam would be of concrete construction with 11 gates, and would create a maximum head of 27 feet, although the normal "working" head would be less. He estimated the proposed plant would develop 63,000,000 kilowatt-hours of power a year.

Further testimony was given by Mr. Utegaard when hearings were held at Friendship, Wis. the fourth day on construction of the Petenwell power dam and hydro-electric plant, according to the Consolidated Company's application. His estimate was that this development would cost approximately $8,300,000, with the dam and plant figured at $7,050,000. Land already acquired in the reservoir area has cost $1,079,000, he said and other needed property would cost about $196,000.

George W. Mead, president of Consolidated Water Power and Paper Company, also testified at this hearing saying a schedule of land already owned is being prepared, and that these lands would be turned over to WHA if the PWA grant for the de-

(Continued on page 23)

Toronto Expects Improved Business Soon

Upward Trend In Agriculture and Mining Industries Encourage Canadian Paper Trade—Offer for Abitibi Ground Wood Mill Rejected—employment In Pulp Wood Camps Rises—Hinde & Dauch Maintain Production.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., September 6, 1938—The feeling that conditions in the pulp and paper line will show some improvement at an early date is spreading and is based upon several important factors, particularly the encouraging position in basic industries such as agriculture and mining along with a good agricultural harvest and slightly stronger prices for farm produce.

It is generally admitted that the state of affairs in the paper market has not been commensurate with the upward swing in other industries. Very few wholesalers or manufacturers care to make any definite predictions regarding the last three months of the year. The newsprint outlook is regarded a little more encouraging as the surplus stocks are being consumed.

In the book and writing line, buying is still from hand to mouth, but with the advent of cooler weather, the return of many business representatives from their holidays and the fact that several large printing and advertising jobs have been held over till September, the feeling prevailing is that next month should result in greater activity. Manufacturers of papeterie lines have been busy preparing for the reopening of the schools.

It is reported that there has been some distress selling in Canada of lower grades of paper produced in the United States with prices considerably less than on similar lines in the Dominion, but Canadian printers have, for the most part, confined their patronage to local mills on the grounds of service, convenience and the desire to maintain established connections and credit.

In respect to boards of all kinds, business has been quiet but producers are confident that the closing months of 1938 will witness a considerable pickup. The lines holding up best are folding boxes with conditions in folding boxes not too encouraging. In domestic rags and waste paper the prices of cotton cuttings have strengthened somewhat during the past few weeks. The mills seem readier to take on good lots of rags at reasonable prices.

Offer for Abitibi Ground Wood Mill Rejected

A syndicate of business men under the direction of F. B. Gibbs, Sturgeon Falls, Ontario, was organized some time ago to rehabilitate the ground wood pulp plant of the Abitibi Power & Paper Company, Limited at Sturgeon Falls, which was closed in 1931. The syndicate offered the company $12,000 for rental of the plant and part of the taxes and insurance premiums. It was stated that $10,000 was already available and also a market for the ground wood pulp. The proposition was not favorably entertained by the receiver of the Abitibi Company or by the Department of Lands and Forests for Ontario. Walter Cain, deputy minister of Lands and Forests, assured the backers of a proposed new ground wood mill which they intend to launch of every cooperation of the Department. He said the province has the deepest sympathy for the situation at Sturgeon Falls, but counselled financial caution against any move which might only aggravate affairs in the long run. The syndicate at Sturgeon Falls, having failed to make an offer approved by the Abitibi receiver and the Department, has announced a new project and hope to carry out the scheme.

G. T. Clarkson, receiver of the Abitibi Company, declined to comment on the charge that the company did not want to run the mill itself and would not let anyone else run it. He said that the offer of the Sturgeon Falls syndicate had been rejected because it was not good enough and not backed by sufficient guarantee. The Department of Lands and Forests states that when a reasonably substantial proposition is advanced, it will be glad to approve the deal. Mr. F. B. Gibbs, of the Sturgeon Falls syndicate, declares that an alternate plan will now be proceeded with, and a new mill erected at an early date in Sturgeon Falls.

More Great Lakes Stock Listed

Additional shares of the Great Lakes Paper Company, Limited, Port Arthur, Ontario, were recently listed at the Toronto Stock Exchange and called for trading. Listing covers 10,000 no par value Class "A" preferred shares and 20,000 no par common, bringing total listed capital to 100,000 Class "A" preferred and 99,991 common. Previously listed 90,000 Class "A" preferred and 79,991 common shares are represented by Voting Trust Certificates. The newly listed stock is that which was recently delivered to the liquidator for distribution according to the approved arrangement made under the provisions of the Companies Creditors' Arrangement Act.

Hinde & Dauch Maintain Production

Hinde & Dauch Paper Company of Toronto, Canada, has been able to maintain its business at approximately the rate prevailing earlier in the year. In July it was stated that drop in demand in the second quarter of 1938 was continuing at about the same rate as in the early months. It is reported that the container end of the business is down about 18% from last year, while the paperboard line has declined from 10% to 12%. It is also understood that company officials are somewhat less optimistic about the immediate outlook than a month or two ago.

G. W. Pauline Returns from England

George W. Pauline, Toronto, vice president and managing director of the Alliance Paper Mills, Limited, Merritton, Ont., has returned from a seven weeks' successful business trip to Great Britain. While overseas, he was invited by Lord Portal, chairman of the Wiggins-Teap group of paper mills, to pay a visit to the plant at Laverstoke, Hampshire, which has made the paper for the Bank of England notes ever since 1719. The privilege was greatly appreciated by Mr. Pauline.

BETTER LOOK INTO IT!

Here's what you'd see if you looked into a triple treatment Bird Centrifiner. But have you looked into its money-making and money-saving possibilities as applied to your paper? . . . If you haven't, you'd better. Modern Bird Centrifining opens up opportunities for improvement and economies that no maker of high grade papers can afford to overlook . . . Say the word and we'll give you the facts in terms of your own product and production.

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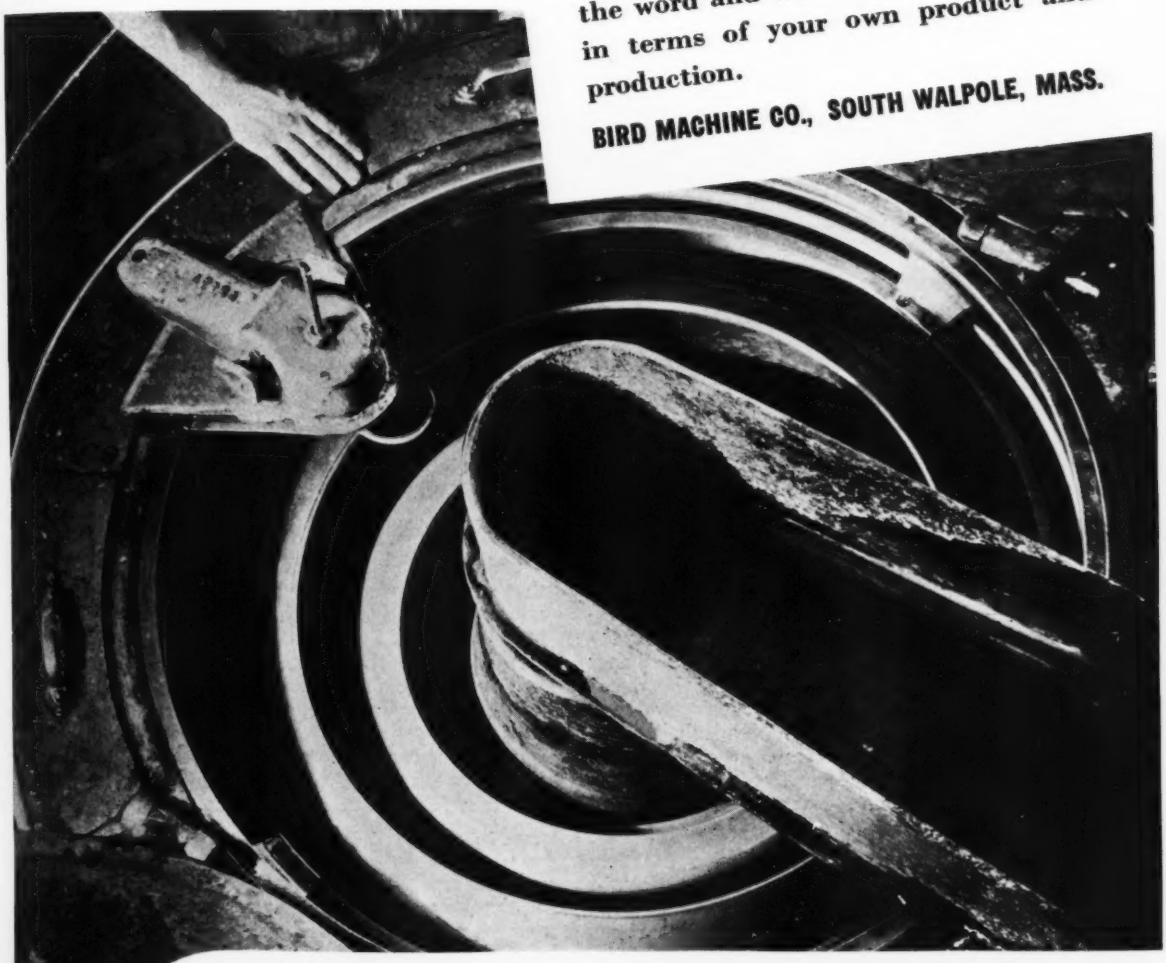

BIRD CENTRIFINER

Chicago Expects Uptrend in Demand Soon

Midwest Reports Better Sales In Distribution of Some Grades of Sulphite Papers — Exhibitors At National Paper Trade Association Meeting At Hotel Stevens September 19-21 — Wood Pulp Rates—Other Trade News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., September 6, 1938—The Chicago paper industry continues to mark time as the rest of the business world awaits to see "what will happen after Labor Day". Meanwhile, retailing reports an expectancy for a genuine upturn in buying while word from the automobile centers nearby has also contributed to a better feeling locally. Here and there, such as in certain grades of sulphites, business is reported as much improved while book and cover representatives locally also have indicated an improved situation in mill production. Kraft conditions are considered as "favorable" and the market structure is said to have firmed up recently with the advent of slightly better demand. Ground wood papers show little disposition to change while newsprints are in about the same category. The past week saw a slight weakening in certain grades of waste papers, considered by some as a natural reaction to the improvements noted earlier and by others to indicate a slowing up of business until more than "expectations" are offered to trade in general.

Exhibitors at N.P.T.A. Meeting

The list of exhibitors contracted for space at the forthcoming fall meeting of the National Paper Trade Association is rapidly approaching the forty mark. Visitors to the convention at the Stevens Hotel on September 19-21 are certain of quality displays of well known products. Exhibitors as well will find to their liking the plan of the Exhibit Committee, of which C. E. Roach of the Capitol City Paper Company is a member, to restrict entries to the exhibit floors only to those wearing the proper credentials. Thus all "sample hounds" and outsiders will be excluded to the benefit of all concerned. Included among the list of exhibitors now ready to display their wares are the following: Bay West Paper Company, Crossett Paper Mills, Midland Products, Inc., Rexford Paper Company, Wolf Brothers, Crystal Tissue Company, A. W. Mendenhall Company, Hinde & Dauch Paper Company; Sutherland Paper Company, Oneida Paper Products Company, Orchard Paper Company, Northern Paper Mills, Racquette River Paper Company, Sorg & Superior Paper Company, Central Paper Company, Cleveland Mill & Power Company, Hobert Paper Mills, Lily Tulip Cup Company, Mid States Gummed Paper Company, Milwaukee Lace Paper Company and the Universal Paper Products Company. Other exhibitors are expected to be added to the imposing list right up to the opening dates of the Fall meeting. Latecomers, however, are going to find that choice positions will still be available under the admirable floor scheme worked out by the Exhibits Committee in conjunction with the management of the Stevens Hotel.

Change in Northwest Personnel

Executives of the Northwest Paper Company utilized a two-day sales conference recently held in Chicago to say goodbye and give the proper remembrances to R. C. Johnson, resigned, and to announce a number of personnel changes of interest to the trade and all designed to give a more comprehensive and speedy service to customers. J. M. Guest, until recently the manager of converting paper sales in this area is now to act as manager of the Chicago district with complete supervision of both the fine and converting divisions. C. P. Sheldon, formerly manager of the San Francisco office is to be the sales manager of fine paper sales while O. F. Browler is to take the place of Mr. Sheldon in the far West Coast office. The new Chicago sales manager of the converting paper division is to be E. A. Bulawa who was moved up from the general sales staff of the Chicago office. Mr. Sheldon will take over the position formerly held by R. C. Johnson while Mr. Bulawa goes into the job made vacant by Mr. Guest when he became manager of the Chicago district sales organization.

E. L. Klima Visits Eastern Mills

E. L. Klima of the Eastern Manufacturing Company's Chicago office, recently returned from a visit to the New York offices of that concern and also spent three days at the Eastern Mills in South Brewer, Maine. The visit, though of short duration, was reported by Mr. Klima to have been very helpful in his job of handling inside orders for the Chicago offices in the Conway Building.

Discuss Wood Pulp Rates

Chicago paper interests are reported to understand that southern port lines have recently been discussing with barge operators on the Mississippi the possibility of a general lifting of wood pulp rates. Official territory carriers, however, have recently stated they were unable to favor such an advance on wood pulp as are published to meet water and truck competition and have further stated, it is reported, that these sources of competition may necessitate still lower rates if wood pulp is to be retained for rail handling.

M. & O. Moves Office to Chicago

Rondeau O. Warner, manager of Merchants Sales, of the Minnesota and Ontario Paper Company, has announced that the headquarters office of the Merchants Sales Division of the company was established at 205 W. Wacker Drive, Chicago, on September 1.

Mr. Warner states that the sole purpose in moving the sales headquarters to Chicago is that it might be more centrally located. He states that the company has developed and will continue to develop additional printing grades, most of which, because of the geographical location of the company's plant, will naturally be marketed through Chicago. Therefore, a more satisfactory customer contact will result from the division being located in Chicago.

IMPROVED BELOIT REMOVABLE FOURDRINIER

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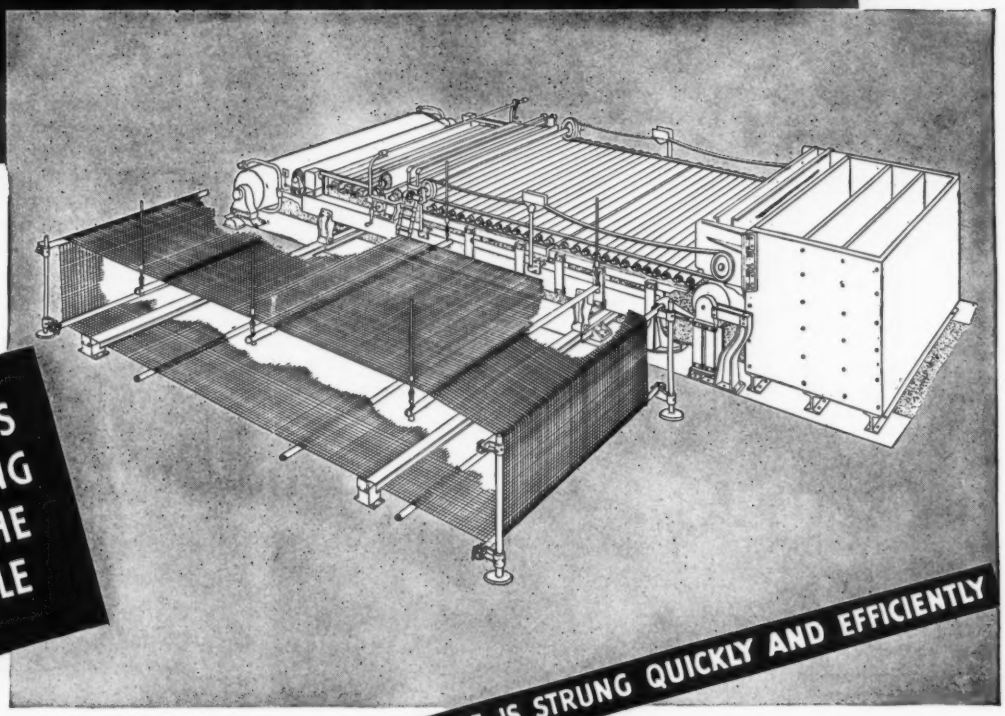

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WIRE IS STRUNG QUICKLY AND EFFICIENTLY

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1 Wire is strung in aisle while machine is in operation, if desired.
2 Fourdrinier pit can be washed out while wire is being installed.
3 Wire bundle is taken from shipping box and mounted directly in carriage—no chucks to apply—no further handling as bundle is unreeled as carriage moves along to form wire loop.
4 All wire poles are mounted in carriage before loop is formed. Inside poles are inserted inside the wire.
5 Safest—most convenient—quickest method of installing Fourdrinier wire.

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THE BELOIT WAY IS THE MODERN WAY

BELOIT IRON WORKS PAPER MACH'Y BELOIT, WIS., U.S.A.

Financial News of Pulp and Paper Industry

S. D. Warren Co. net profits show sharp decline — Nashua Gummed & Coated Paper Co. and subsidiaries report for the twelve months ended June 30 gross sales of $6,944,802—Continental-Diamond reports $437,126.

NEW YORK STOCK EXCHANGE

High, Low and Last for the Week Ending September 7, 1938

	High	Low	Last
Armstrong Cork Co.	44¼	42¾	43¼
Celotex Corp.	23¾	22	23¾
Celotex Corp., pf.	66½	65½	65½
Certain-Teed Products Corp.	10⅜	9¼	10¼
Certain-Teed Products Corp., pf.	41¼	37½	40⅞
Champion Paper & Fibre Co.	24	22¾	23½
Congoleum-Nairn Co.	27¼	25¾	27¼
Container Corp. of America	15¾	14⅝	15½
Continental-Diamond Fibre Co.	9½	9½	9½
Crown-Zellerbach Co.	12⅝	11¾	12⅝
Crown-Zellerbach Co., pf.	80	76⅞	79⅜
Flintkote Co.	25¼	22	24⅞
Robert Gair	4½	4⅛	4⅛
Robert Gair, pf.	14	13½	14
International Paper & Power	9¾	9	9½
International Paper & Power, pf.	42¼	38½	42
Johns-Manville Corp.	99	95½	99
Kimberly-Clark Corp.	28¾	28¾	28¾
MacAndrews & Forbes	28¾	28¾	28¾
Masonite Corp.	54¾	51½	54¾
Mead Corp.	13	12	13
Mead Corp., pf.	67	67	67
Paraffine Companies, Inc.	49	46½	49
Paraffine Companies, Inc., pf.	99⅛	99⅛	99⅛
Ruberoid Co.	28½	26¼	28½
Scott Paper Co.	47¾	47¼	47½
Sutherland Paper Co.	30	29⅛	30
Union Bag & Paper Corp.	13¾	12½	13½
United Paperboard Co.	7	6⅝	7
U. S. Gypsum Co.	99⅛	96	99

NEW YORK CURB EXCHANGE

High, Low and Last for the Week Ending September 7, 1938

	High	Low	Last
American Box Board Co.	9⅜	9¼	9¼
Brown Co., pf.	24	22¼	24
St. Regis Paper Co.	3¼	3	3⅛
Taggart Corp.	5⅜	5¼	5¼

Nashua Gummed Reports $6,944,802

The Nashua Gummed and Coated Paper Company and subsidiaries reports as follows for the twelve months to June 30: Consolidated gross sales, $6,944,802; net income, including provision for income and excess profits taxes and minority interest, $129,856. After allowing for dividends on $7 cumulative preferred stock, balance was equal to $2.21 each on 46,058 no par common shares. No strictly comparable figures available, but for full year 1937 company showed consolidated net income of $412,168, or $8.35 a common share after preferred dividends. For the twelve-month period net income of the parent company only was $86,634 and gross sales were $5,589,878.

Continental-Diamond Reports Loss

Continental-Diamond Fiber Company reported for the six months, ended June 30, a net loss of $437,126, against a net profit of $323,625 last year. Quarter operations to June 30 resulted in a net loss of $198,371, against a net profit of $142,437 last year.

Imperial Paper Reports $380,201

The Imperial Paper and Color Corporation reports as follows for the year to June 30: Net income $380,201, equal to $2.61 each on 145,658 common shares, against $678,559, or $4.66 a share, in preceding year.

S. D. Warren Net Down Sharply

In the first half of this year a sharp shrinkage in profits was suffered by S. D. Warren Company. Net profit after all charges except Federal taxes in the six months ended June 30, 1938, was $95,890, which compared with profit before taxes of $402,195 in the first half of 1937. Net after Federal taxes this year was $88,115, equal to 87 cents per share on the 101,387 shares of stock outstanding.

Comparison is made with the best six months in the company's recent history. Production in the first half of this year was down 27 per cent from that in the unusually good period a year ago. In July and August, however, the rate of operations was stepped up, and currently the plants are running three shifts, five days a week. Prices have declined slightly, but offsetting factors are a wage reduction and a cut in the price of pulp which the company buys.

As of June 30, 1938, S. D. Warren Company had current assets of $3,441,803 and current liabilities of $558,768, making net working capital $2,883,035, which compares with working capital of $2,924,889 on Dec. 31, 1937, and $2,919,097 on June 30, 1937.

Brazil Imports Less Paper

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D C., September 6, 1938—The general outlook for imported paper products from any country is not encouraging in Brazil inasmuch as there is a well developed domestic paper manufacturing industry. Practically every type of paper is now being manufactured in Brazil and while quality in most lines is inferior to that of imported papers, the local product is improving rapidly and it probably will be only a question of time until all requirements in the volume line will be supplied from local manufacture.

Practically all types of writing paper with the exception of those classified as drawing and tracing papers are manufactured in Brazil. There are imported small amounts of fancy boxed writing paper and cards with envelopes, but these are only for the very limited few who are sufficiently affluent to buy and use expensive stationery.

Newsprint Exempt from Marking

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 7, 1938 — Acting Secretary of the Treasury, Wayne C. Taylor, has announced that newsprint paper and wood pulp are among the articles exempt from marking to indicate the country of origin by reason of having been imported in substantial quantities during the five year period prior to January 1, 1937, without being required to be marked. The decision was announced in accordance with requirements of the recently enacted customs administrative law.

• EBG maintains a thorough "follow through" policy in serving customers' needs for liquid chlorine. It begins with a closely supervised delivery system and includes expert technical assistance in every type of application. You'll enjoy the friendly and willing cooperation that goes with every shipment of EBG Liquid Chlorine. It's one of the reasons why customers say, "They treat you right at EBG!"

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EBG Liquid Chlorine

FIRST IN THE COUNTRY

Glidden Releases "Prosize" Process to The Paper Industry

P. E. Sprague [1]

The Glidden Company of Cleveland advises that a notice has been sent to paper manufacturers throughout the United States within the last few days, concerning the exclusive license now owned by the Glidden Company under the patent covering the "Prosize" process and also advising the industry of the very favorable terms and conditions under which the process is available for all paper manufacturers who care to use it in the United States.

Result of Definite Program of Research

The story of "Prosize" is an interesting one and is another of the many examples of the benefits to be derived in the arts and industries from a definite program of research work.

More than ten years ago, Adrian D. Joyce, president of the Glidden Company, conceived the idea that the Glidden Company develop the commercial production of proteins from the soya bean. Ever since, the company has pioneered in this field and has done outstanding work. Technical experts were sent to Europe to study the problem and some work was done both in Europe and in this country. Early in 1930 the Glidden Company definitely inaugurated the project and has prosecuted it vigorously ever since, both with semi-commercial and commercial pilot plant operations.

The extration and isolation of the protein on the basis of large scale production proved to be a complicated, lengthy and expensive undertaking. It was early recognized in this work that in order to successfully isolate the proteins it would be necessary to control the manner in which the soya bean was handled throughout the entire process of removing the oil and preparing the meal. This could only be accomplished by constructing a complete plant for processing the bean. This was done, and by arrangement with the European patent owners, a large processing plant employing the Hildebrand continuous extraction process was erected in Chicago and has been in operation for several years. A successful conclusion to the project came last year and a large modern works for the manufacture of the proteins was completed in the spring of this year and is now fully equipped and in operation in Chicago.

Alpha, Beta and Gamma Proteins

The products of the plant are designated as Alpha Protein, Beta Protein, Gamma Protein and certain other forms of commercial soya bean proteins, each and all of which are now available in any quantity desired on a basis of controlled uniformity and quality.

The proteins exist in both simple and complex forms and are found in both the animal and vegetable kingdoms. Milk casein, for example, is an illustration of a definite complex protein yielding phosphorous compounds and amino acids upon hydrolysis, and the soya bean protein an illustration of a simple protein yielding only amino acids upon hydrolysis. An interesting discussion in further detail will be found in the article by W. J. O'Brien on "Soya Bean Proteins" as published in the Journal of the Second Dearborn Conference of the Farm Chemurgic Council. The potential uses of these proteins in industry are legion.

Valuable Function in Paper Sizing

Knowing that casein was largely used in the paper industry it early became apparent that Alpha Protein had promise of performing a valuable function in connection with the sizing of paper, and about the same time that the material became available from pilot plant operations it was learned the Institute of Paper Chemistry at Appleton, Wis., had likewise started a project involving a fundamental study of the scientific foundations underlying the use and control of rosin size and size manufacture and the sizing of paper.

A joint project was set up by the Glidden Company and the Institute of Paper Chemistry in 1935 to continue and prosecute both of these objectives with an understanding that any patents resulting from the work should be made available to the paper industry on advantageous terms.

Nelio Rosin

Coincidentally, while developing Alpha Protein, the Glidden Company through its Naval Stores Division (Southern Pine Chemical Company Division) of Jacksonville, Fla., had been developing a unique, uniform pure gum rosin, now designated as "Nelio" Rosin. The story of "Nelio" Rosin and its development is a separate romance of the application of modern research to an age-old business, and it can be summarized by the statement that "Nelio" Rosin represents a uniform and pure gum rosin available for the first time direct from the producer to important consumers. It is obvious that such a rosin is destined to play an important part in paper sizing and has already demonstrated its successful part in the picture.

One of the first patents resulting from the research project was the so-called "Prosize" Patent, being U. S. Patent 2,116,768. This patent covers a method of preparing a paper size and involves the use of soya bean proteins and under some circumstances the use of any protein and which accomplishes a great improvement in the character of the size and the results secured with same. The extent and scope of the improvement depends upon the existing character of the individual size operation and its efficiency. This improvement has been demonstrated and realized in a large representative group of paper mills and is of interest to the entire paper industry. The use of the process is not confined to any par-

[1] Vice President The Glidden Co., Cleveland, Ohio.

ticular type of rosin size or type of equipment that may be used for making this size and it may likewise be used with various types of rosin.

Sub-License for Use of Process

In the announcement recently made by the Glidden Company, a sub-license for the use of the process is offered to the paper industry on very satisfactory and equitable terms involving no expense to the paper manufacturer.

The Alpha and Beta Proteins possess many characteristics similar to proteins of animal origin and in addition have some unique properties of their own. The use of the Alpha Protein in the "Prosize" process is obviously but a limited application and it seems probable that a much more wide use in the manufacture of paper awaits but the necessary presentation of some of the work already done. The economic and commercial aspects of the material are likewise interesting.

Gamma Protein in Wall Paper Industry

The wall paper industry is generally quite familiar with the progress made in the use of Gamma Protein in the manufacture of wall paper, the presentation of which to wall paper manufacturers during the past two years has been handled through Glenn Davidson and associates at Aurora, Ill., selling agents for the Glidden Company's Gamma Protein.

Since the only proteins available today for industrial use originate from animal life, either through the slaughter house or the dairy, it is quickly recognized that such products are subject to a wide variation in cost and in supply.

The Glidden Company's soya bean project for commercial protein manufacture rests upon an economic assumption that the material can be made available to consumers at a level price year in and year out, which is an advantage quickly recognized by paper manufacturers and has been accorded hearty endorsement.

Important Contribution to Industry

The union of Alpha Protein and "Nelio" Rosin in the control and production of paper size has produced an outstanding contribution to the paper industry and it would be remiss if the Glidden Company did not state that it takes pride and pleasure in having been instrumental in the consummation of such a development. It is believed the results will fully justify the faith placed in the project from the start and the substantial investment of money in plant and equipment that has been involved in making it a commercial reality.

This whole enterprise is a definite part and parcel of the great Farm Chemurgic movement which is gripping the imagination of business men in this country as never before and bridges one of the gaps in that long road from the farm to the factory which the American economy must successfully travel as the years pass.

Employment in Wood Camps Rises

According to D. Smith, Crown Timber Agent at Sault Ste. Marie, Ontario, employment in lumber and pulpwood camps in the district of Algoma during August was the heaviest in midsummer for some years. Over 1100 men were engaged in pulpwood and lumber mill work while a year ago the number was less than 1000.

Indianapolis Is Optimistic

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., September 6, 1938.—Little change was seen in the local paper market during the last week, but the sales volume continued at about the same level as the week before. The trade is rather optimistic concerning prospects for the fall trade. There was quite a bit of activity in the fine paper market during the week with covers, ledgers and bond all having some sales. The volume of fine paper going to the retail trade increased somewhat with the opening of schools in the immediate offing. Prices are holding firm and there are some who predict increases during the coming month.

Sales of summer specialties dropped sharply during the week and unless there is a very late fall the trade feels the season is about over. Labor day will be the last summer holiday and stocks in retail hands are fair-sized and will not be increased. In fact, all efforts will be bent toward clearing off what stocks remain.

There appears to be a fair volume of box business. Demand from breweries has been heavy all during the summer and thus far has shown no signs of declining. Several industrials which use boxes have increased their production and others which have been down for some weeks are getting back into production. A slight drop in demand for containers by the ice cream trade was seen during the week but prices are being held.

Building papers appeared to increase in popularity during the week with dealers laying in stocks against the fall trade, which promises to be very good. It is certain demand will be better this fall than it was the same time last year.

Tissues continued in good demand. The paper stock situation is unchanged with some mill demand for common grades and with prices being held the same as during the last fortnight. According to some there are heavy stocks both of paper and rags in this territory.

Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 7, 1938 — The Government Printing Office has received the following bids for 40,000 pounds of No. 32 yellow sulphite writing paper: Cauthorne Paper Company, 5.34 cents; Stanford Paper Company, 5.795 cents; Barton, Duer & Koch Paper Company, 5.724 cents; Marquette Paper Company, 5.78 cents; R. P. Andrews Paper Company, 5.53 cents; Aetna Paper Company, 5.57 cents; Mathers-Lamm Paper Company, 5.36 cents; Paper Corp. of U. S., 6.2 cents; Whitaker Paper Company, 5.974 cents; Mudge Paper Company, 5.34 cents; and Butler Company, 5.65 cents.

For 13,400 pounds (100,000 sheets) of 38 x 48 blue M. F. book paper: Barton, Duer & Koch Paper Company, 7.09 cents; John F. Post, Inc., 6.5 cents; Walker, Goulard, Plehn Company, Inc., 6.51 cents, and Stanford Paper Company, 6.5 cents.

For 2,400 sheets of 22 x 28 mist gray photo mount board: Mathers-Lamm Paper Company, $42.50 per M sheets; R. P. Andrews Paper Company, $43.63; Whitaker Paper Company, $41.61; Mudge Paper Company, $41.56; Barton, Duer & Koch Paper Company, $32.56 and Hurlock Brothers, $43.91 less 2 per cent.

HEARINGS ON WISCONSIN STATE POWER PROJECT

(Continued from page 13)

velopment plan is secured, without profit above the investment made in the holdings.

A statement prepared by Gov. Philip F. La Follette, who will head WHA, was read at the hearing. It explained the interest of the state in the project, and the necessity for the hearings in securing the rights to build the various units of the plan.

A final hearing was scheduled at Mauston, Wis., to consider Consolidated's application for another dam and power site at Germantown, on the Wisconsin River, and also on the proposal to divert water from Wisconsin River to the Fox River via a canal at Portage, Wis.

Hundreds of landowners were at the hearings, those whose property would be affected by the reservoirs and floodings. Aside from seeking assurance they would be properly compensated for any damage they might suffer, they voiced practically no objection to this "Little TVA," and its vast man-made control of flood waters to be used for uniform water power flow the year around.

No Danger of Timber Shortage

There is no danger of a timber famine in the Great Lakes states, upon whose forests paper mills are largely dependent for their wood supply. O. T. Swan of Oshkosh, Wis., manager of the Northern Hemlock and Hardwood Manufacturers' Association, issued a statement last week to this effect, basing his conclusions on a government survey.

The survey indicates Wisconsin, Michigan and Minnesota have 60 per cent more saw timber than previously estimated. Discussing the survey, Dr. Raphael Zon of Minneapolis, director of the Lake States Forestry Experiment station, said it also shows 40 per cent more timber area in the three states.

Mr. Swan also says Wisconsin, with 16,612,000,000 feet of both hardwood and softwood, has more timber now than a state survey estimated 15 years ago. The inventory gives Wisconsin 11,903,000,000 feet of hardwoods and 4,709,000,000 feet of softwoods; Michigan, 18,965,000,000 feet of hardwoods and 9,584,000,000 feet of softwoods; Minnesota, 12,454,740,000 feet of both hard and softwoods, with a small preponderance of softwoods.

Kimberly-Clark Safety Awards

Eleven employes of Kimberly-Clark Corporation, Neenah, Wis., who have records of more than 25 continuous years of safety service were awarded gold pins during the first annual safety day exhibition held in connection with the picnic of the Neenah employes Sunday, August 28. More than 1,500 attended the outing at Lakeview mill park, sponsored by Lakeview Recreation Association.

To Supervise Paper Machine in France

Burt Raprager, superintendent of paper machines at Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., is leaving this week for France to supervise starting of a paper machine at Rouen. The French machine has been fitted with a section to apply the Consolidated's patented coating process directly on the machine, under lease of patent rights. Mrs. Raprager accompanied her husband, and they expect to spend six weeks in Europe while production is getting under way. Mr. Raprager spent five months in England two years ago on similar installations.

A. Redlin Goes to Beach-Arthur Co.

Arthur Redlin, in charge of the wall paper division of the Kimberly-Clark Corporation, Neenah, Wis., has resigned to accept a position as general superintendent of the Beach and Arthur Paper Company, Paperville, Pa. He was associated with Kimberly-Clark for twenty-five years.

Van Hammond-Wall Nuptials

Cornelius Van Hammond, superintendent of the Oconto Pulp and Paper Company, Oconto, Wis., and Miss Edna M. Wall of Oconto, were married August 30 at St. Anthony Catholic church at Oconto. They spent their honeymoon in southern Wisconsin.

Tissue Industry at Lake George

A big attendance representing the tissue industry is expected at the second mid-year conference of The Tissue Association to be held at the Sagamore Hotel, Lake George, N. Y., on September 14-15-16. The general meeting will be opened by an address of welcome by C. Alfred Wagner, president of The Tissue Association. Wages and Hours will be discussed and divisional meetings will be held in the afternoon and evening.

At the meeting on Thursday morning the topic for discussion will be "Necessary Steps in Merchandising High Grade Products", followed by divisional meetings and a sports program in the afternoon.

On Friday, the program will include the following features: "Making Statistics Produce Dividends", leader, O. E. Horton, cost accountant of Frazer Industries, Inc.; "The Exchange of Cost Information", leader, E. R. Hankins, president of Hankins Container Company; "What Has Happened to the Robinson-Patman Act", leader, C. G. Daughters, lawyer and associate of Senator Patman; and "What's Ahead on Pulp", leader, Oliver Porter, secretary of the United States Pulp Producers Association.

Succeeds Payson Varnish Co.

Payson Paint & Varnish Corporation has been organized to take over the business of the well known and long established Payson Varnish Company, whose plant is located at 141st street and Southern Boulevard, New York City.

Directors of the new company are H. B. Prior, H. R. Prior and T. S. Nichols, all of whom are officers of Prior Chemical Corporation.

Pulpwood in Heavy Weather

Pulpwood rafts recently had a very rough trip across Lake Superior before reaching their destination at Munising, Michigan. C. W. Cox's raft consisted of 4000 cords, left Nipigon, and the Thomas Falls raft of 4500 cords, left Trout Bay. The tug, Strathbogie, which towed the Falls raft, was struck by lightning off Autrian Point. The bolt felled the mast, scarred the hull and narrowly missed striking two sailors.

Cellulose Sales Co. Organized

The Cellulose Sales Company, Incorporated, 250 Park Avenue, New York, has just been organized to represent The Swedish Pulp Company of Stockholm, Sweden, beginning September 1, in the United States.

According to the official announcements made by the Swedish Pulp Company, "It has long been the desire of The Swedish Pulp Company to conduct the major part of our business through one channel in the United States, believing that by so doing we could best serve the interests of our American customers."

N. R. Johaneson, President of Johaneson, Wales & Sparre, Inc., is the president of the Cellulose Sales Company. The other officers include the following: K. J. Lundahl, vice-president; O. A. Wales, vice-president; P. G. Sparre, vice-president and treasurer; G. M. Spencer, secretary.

N. R. JOHANESON

According to Mr. Johaneson, the entire staff of Johaneson, Wales & Sparre, Inc., will join the new company, thus continuing the same highly effective service that this organization has been giving to American paper manufacturers for more than twenty years.

The Swedish Pulp Company manufactures annually approximately 350,000 tons of bleached and unbleached sulphite, 375,000 tons of kraft pulp and 200,000 tons of groundwood. The timberland owned outright by The Swedish Pulp Company and affiliated companies comprises more than 5½ million acres.

The president of The Swedish Pulp Company is Torsten Hernod and the vice-president and director of sales is Einar Flygt, both of whom are well known among the pulp and paper manufacturers in the United States because of their frequent visits to this country.

The mills and mill brands belonging to The Swedish Pulp Company include the following:

Bergvik & Ala Nya Aktiebolag—"Goat-brand" Sulphite and Kraft.

Travaruaktiebolaget Svartvik—"Svartvik" Rayon, Bleached, Easybleaching, and Unbleached Sulphite.

Nyhamns Cellulosa Aktiebolag—"Nyhamns" Easybleaching and Strong Sulphite.

Sundsvalls Cellulosa Aktiebolag — "Essvik" Bleached Sulphite.

Torpshammar Aktiebolag — "Torpshammar" Groundwood.

Skonviks Aktiebolag—"Skonvik" Semi-bleached Sulphite.

Sunds Aktiebolag—"Sund" Mitscherlich Sulphite.

Aktiebolaget Ostrands Sulfatfabrik—"Ostrand" Bleachable and Strong Kraft.

Kramfors Aktiebolag—"Kramfors" Mitscherlich Sulphite and "Buffalo" Kraft.

Stromnas Aktiebolag—"Nensjo" Bleachable and Strong Kraft.

Holmsunds Aktiebolag—"Obbola" Kraft.

Munksunds Aktiebolag—"Munksund" Kraft and Groundwood.

Atlantic Research Associate Changes

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., September 6, 1938—The Atlantic Research Associates, Inc., 763 Washington street, Newtonville, Mass., announce that hereafter all manufacturing and selling of products developed by them for use in the paper, paint, rubber and similar industries will be done by the new corporation, Atlantic Research Products, Inc.

Atlantic Research Associates, Inc., will continue their varied research program in these and other fields. The large staff of graduate chemists in this organization will be available to the new company for technical and engineering assistance but will not be concerned with either manufacture or sale of products. Atlantic Research Products, Inc, will be concerned solely with manufacturing and marketing of products either from processes developed by Atlantic Research Associates, Inc., or of products which may be of value to other National Dairy Products Corporation companies as consumers.

The new organization will be headed by F. C. Atwood as chairman of the board, but the executive management will fall upon the officers, who are Edward F. Maloney, president; N. J. Reilly, vice president, and A. O. Bauer, secretary and treasurer. The board of directors will consist of the above, with A. A. Stickler, James Bruce and Livingston S. Jennings.

French Paper Production Slower

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., September 7, 1938 — Although no figures are available for production during the first 6 months of the current year, it is obvious that the sluggish French market for the past 6 months must be resulting in a considerable slowing up in paper production. According to reports from the American Consul at Nantes during this period the market has been very dull, few transactions being reported, and French importers have been obliged to refuse delivery of lots ordered. Paper prices remained practically unchanged during the second quarter, lack of demand preventing rises and high production costs precluding tangible reductions.

A decree was published under date of May 25 permitting the recovery of lost hours not to exceed 100 per annum, nor one per day, providing that workmen having effected such supplementary hours may not be discharged for lack of work within one month, or if discharged after one month, they are to be accorded priority of reengagement within 6 months after discharge.

Homer Stafford Retires

KALAMAZOO, Mich., September 3, 1938 — Homer Stafford, who retired Wednesday as plant superintendent of the Hawthorne Paper Company after more than half a century in the paper industry, started to work in the paper mills at the age of 13 for 5 cents an hour pay.

It was 51 years ago Monday that Mr. Stafford obtained a job as reel boy in the newsprint mill of H. Remington & Sons in Watertown, N. Y., working 13 hours a day from 6 in the evening until 7 in the morning for the big wage of 65 cents a night or $3.90 a week.

Mr. Stafford has remained with the industry ever since, working in various paper mills over the country including those in Maine, New Hampshire, Massachusetts, New York, Quebec, and Michigan.

His first job as reel boy in the Watertown mill lasted for 13 months before he was promoted to back tender.

By the time he was 17 he had advanced to machine tender, which was considered a good position at that time for a boy of his age. He worked as machine tender for three years in the Watertown plant and then went to Brownsville, N. Y., where he accepted a similar job for the Outerson Paper Company, manufacturers of book, cover and wrapping papers.

He soon was advanced to boss machine tender and a year and a half later went back to Watertown as machine tender for Knowlton Brothers who made a high grade rag paper. He worked with that mill five different times over a period of 27 years, including three times as plant superintendent.

Mr. Stafford came to the Hawthorne Paper Company March 17, 1926, as plant superintendent from Knowlton Brothers to take the place of A. J. Whiteman, who had succeeded Mr. Stafford as plant superintendent in Watertown.

Mr. Whiteman and Robert Pease who was general manager of the Hawthorne Paper Company at about that time, both went to Knowlton Brothers, displacing Mr. Stafford and the general manager in September, 1925.

The greatest change that Mr. Stafford says he has noted in the paper industry in the last half century is the great speed that has been developed in the paper machines.

As to his plans for the future, Mr. Stafford said that he planned to rest and take it easy for awhile, but indicated that he might get tired of such an inactive life and swing back into the harness again a little later.

Mr. Stafford was given a complimentary dinner Monday evening in the Park-American hotel by the department heads and office workers of the Hawthorne Paper Company.

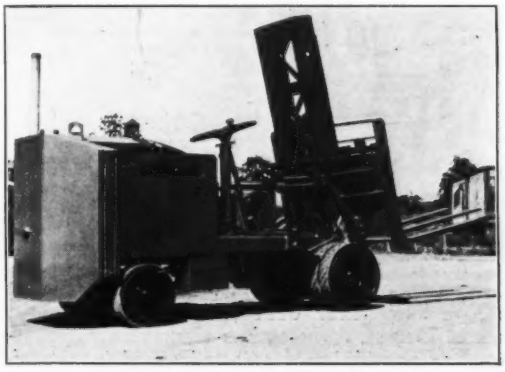
Earlier Monday he was called out into the plant, supposedly to help correct some difficulties with the machinery. But when he got there he found 150 or more of the mill employes assembled. They presented him with an engraved wrist watch as a token of their esteem for him.

Albemarle Profit $35,421

Albemarle Paper Manufacturing Company, reported for the quarter ended June 30, a net profit of $35,421, compared with $177,975 for 1937.

Towmotor Truck for Handling Wet Pulp

A new Towmotor fork truck has just been built for handling wet pulp. It is of extra heavy design, with a special carriage and quadruple fork arrangement to meet the special conditions in pulp mills where heavy bales of wet pulp are handled and



NEW TOWMOTOR FORK TRUCK

stacked constantly. It is also designed with a detachable and interchangeable scoop. Other features, such as straight gasoline power, hydraulic lift and tilt, high speed forward and reverse and driving wheels under the load, are the same as on standard model Towmotor lift trucks, manufactured by the Towmotor Company, 1220 East 152nd Street, Cleveland, Ohio.

Georgia Pulp Arrives at Fort Edward

[FROM OUR REGULAR CORRESPONDENT]

FORT EDWARD, N. Y., September 6, 1938.—Following the arival here this week of several barges loaded with wood pulp from Georgia the local terminal was the scene of great activity. The pulp was brought to Brooklyn by ocean liner and was transferred to smaller boats for the trip up the barge canal to this village. The shipment is consigned to the Hudson Falls mill of the Union Bag and Paper Corporation and will be hauled to the plant by a fleet of trucks which were brought here for the occasion. It was stated that the stevedores will work overtime in an effort to dispose of the unloading before the arrival of more barges. It is understood that additional shipments will be made by the all water route if this shipment is handled in a manner satisfactory to the company.

Homer L. Bunker Dead

Homer Lucian Bunker, 46, vice president of the Baxter Paper Corporation of New York, died yesterday at his home, 13 Washington Park, Maplewood, after a long illness.

Born in Brooklyn, a son of the late Frederick E. and Lucia Moran Bunker, Mr. Bunker attended Montclair High School, where he was prominent in athletics. He lived in East Orange before going to Maplewood 13 years ago. He was a member of Rock Spring Club, West Orange.

Mr. Bunker leaves his wife, Mrs. Beatrice Whitfield Bunker; a daughter, Miss Betty W. Bunker; a sister, Mrs. Lucy B. Hines, and a brother Frederick.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Financing and Operation of Pulp and Paper Mills

General Construction News

Kalamazoo, Mich.—The Sutherland Paper Company, manufacturer of box boards, paper board, coated paper stocks, etc., has plans nearing completion for new addition to mill, to be used for the manufacture of finished paper board products, including paper plates, pails and other containers. It is estimated to cost about $175,000, with equipment. Erection is scheduled to be placed under way at early date, with completion about the close of the year.

Hodge, La.—The Southern Advance Bag and Paper Company, Inc., manufacturer of kraft paper products, has plans under way for new addition to mill for considerable increase in present capacity. It will be one-story, estimated to cost approximately $300,000, with equipment. It is proposed to begin construction early in the fall.

Brooklyn, N. Y.—The Lewis Paper Box Corporation, recently organized with capital of $20,000, is said to be planning early operation of a local plant for the manufacture of a line of paper boxes and containers. New company is represented by Benjamin Mintz, 16 Court street, Brooklyn, attorney.

Chicago, Ill.—The National Paper Company, Hubbard avenue and Green street, manufacturer of paper specialties, has completed plans for new addition to plant, to be one-story, estimated to cost about $30,000, with equipment. Bids have been asked on general erection contract and work will be placed under way early in the fall.

New York, N. Y.—Samuel Goldberg, 405 East Fourth street, manufacturer of paper boxes and containers, has leased space in building at 39 Broome street and will occupy for plant. It is proposed to remove present works to new location, where increased operations will be carried out.

Buffalo, N. Y.—The National Gypsum Company, 190 Delaware avenue, Buffalo, manufacturer of wall board, insulating board and kindred products, has concluded negotiations for purchase of plant and business of the Oakfield Gypsum Products Corporation, Oakfield, N. Y., manufacturer of board and gypsum specialties, and will take over the property at once. Purchasing company will use considerable machinery and equipment at the Oakfield plant in its new mill at Port Wentworth, Savannah, Ga., and transfer to the latter location will be made during the fall. Erection has been started on the new plant at Savannah, for which general contract has been awarded to the George A. Fuller Company, 597 Madison avenue, New York, N. Y., as recently noted in these columns. The mill will be used for the production of wall board and will represent an investment of about $1,000,000. Machinery and facilities will be provided for large output. The mill is scheduled for completion early in 1939. The Fuller company, noted, also is in charge of engineering for the project. Melvin H. Baker is president.

Jacksonville, Fla.—The United States Gypsum Company, 300 West Adams street, Chicago, Ill., manufacturer of wall board, plaster board and kindred products, is said to be concluding negotiations for acquisition of a large tract of land on the Trout River, near Jacksonville, to be used as a site for new mill. Proposed plant will comprise several large one and multi-story units, with power house, machine shop and other mechanical structures. It is reported to cost close to $1,000,000, with machinery.

Greenville, Mich.—The Mengel Company, Zane street, Louisville, Ky., manufacturer of corrugated boxes, and other packages and containers, has leased an industrial building at Greenville, formerly occupied by the Consolidated Corporation, and will improve and equip for new branch plant. Operations are scheduled to begin early in the fall.

Pensacola, Fla.—The Armstrong Cork Company, Lancaster, Pa., manufacturer of board products, insulating materials, etc., has arranged for the acquisition of the Armstrong-Newport Company, Pensacola, manufacturer of insulation products, heretofore jointly owned with the Newport Industries, Inc., Pensacola, and will be the sole owner of the property in the future. Operations will be continued at the Pensacola plant as heretofore, and arrangements have been made with the Newport Industries, Inc., for supply of certain raw materials for production, including wood chips, etc., which heretofore has been the source for such products.

Tacoma, Wash.—The J. E. Berkheimer Manufacturing Company, 2928 South M street, manufacturer of prepared roofing products, is said to have approved plans for rebuilding of portion of plant, recently destroyed by fire, previously reported in these columns, and work will be placed under way. The fire loss approximated close to $100,000, with equipment.

Sandersville, Ga.—The Champion Paper and Fibre Company, Hamilton, Ohio, manufacturer of coated and other paper stocks, is considering early construction of a new clay refining plant in vicinity of Sandersville, for material for use at mill. New plant will be one-story, 60 x 140 feet, and about 50 feet high, and will be equipped for washing and re-

fining of large output. It is estimated to cost about $50,000, with machinery. Erection will be carried out by company forces.

St. Paul, Minn.—The Minnesota Mining and Manufacturing Company, Forest and Fanquier streets, manufacturer of sand paper and other abrasive paper stocks, prepared roofing materials, etc., is said to have approved plans for another addition to mill, supplementing the four-story and basement building now in progress and previously referred to in these columns. The new unit similarly will be four-story and basement, and will replace an existing old structure. Erection contract is being awarded to William M. Murphy & Son, New York Building, St. Paul. Structure is estimated to cost about $250,000, including equipment. Toltz, King & Day, Inc., Pioneer Building, St. Paul, is architect and engineer.

New Companies

New York, N. Y.—The Excelsior Fibre Case Company, Inc., has been incorporated with capital of 20 shares of stock, no par value, to manufacture and deal in fiber boxes and containers of various kinds. New company is represented by Roland V. Wittenberg, 60 Broad street, New York, attorney.

New York, N. Y.—The River Valley Tissue Mills, Inc., has been chartered with capital of $10,000, to manufacture and deal in tissue papers and allied paper stocks. New company is represented by Abraham H. Goldblatt, 60 East Forty-second street, New York, attorney.

I. P. Employees Accept Reduction

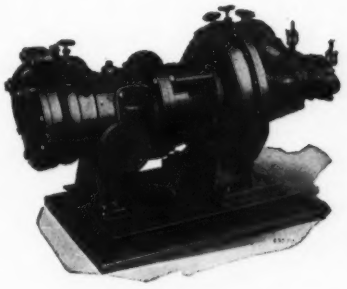
[FROM OUR REGULAR CORRESPONDENT]

CORINTH, N. Y., September 6, 1938.—At a meeting held here this week the employees of the local branch of the International Paper Company voted almost unanimously to accept a five per cent wage reduction which was proposed recently by the concern. Members of the Firemen and Oilers' Union voted to accept the proposition early in the week and the Papermakers' Union and Pulp and Sulphite Workers accepted the reduction the following day. The proposal was offered at a meeting of union representatives and company officials a week ago and required acceptance by a majority of the workers. If accepted by employees of the other mills of the company who were represented at the conference the reduction will affect about 7,000 men in branch plants at Fort Edward, Niagara, Tonawanda and Livermore Falls. The reduction at the Corinth plant means a cut of from three to seven cents per hour. Competition in the papermaking field and general business conditions were cited as making the wage reduction necessary.

Announcement is also made that the company must obtain a tax reduction on its properties at Ticonderoga or steps may be taken to close the branch there, according to James M. Geraghty, general manager of the Ticonderoga Pulp and Paper Company. At a meeting sponsored by the Ticonderoga Chamber of Commerce, Mr. Geraghty charged that there is a wide discrepancy in taxes levied on the company's property at Ticonderoga in comparison to those levied at Fort Edward and other places where the concern operates. The commerce group appointed a committee to seek a general tax reduction on the property.

New Turbine-Driven Pump

Ingersoll-Rand announces a unique new turbine-driven pump featuring a compact construction that combines both turbine and pump as one unit on a common shaft. This pump, known as the "class TRV" is built in single-stage sizes for capacities from 5 to 1000 gallons per minute against heads as high as 220 feet and in two stage sizes for capacities to 275 gallons per minute and heads up to 550 feet.



The featured unit assembly of pump and turbine makes possible a substantial reduction over ordinary turbine-driven pump weights and sizes. A 15 hp single stage unit is about 32" long and other sizes are proportionately small. This compactness of design not only reduces initial cost, but installation and unkeep expense as well. No special foundation is required and units are available for operation in any position. They may be bolted to the floor, wall, tank, column or ceiling, as is most convenient.

Suitable for use wherever a turbine-driven pump is desirable and replacing many older duplex steam pumps, these units are particularly applicable for use in refineries, chemical plants, mines and other locations where hazardous gases are present. They are equally adaptable for general industrial service where process steam may be utilized, as well as for boiler feed service at boiler pressures up to 200 lbs. per square inch. When steam is not available, the turbines can be efficiently operated on compressed air.

Additional information on these pumps is contained in bulletin 2390, copies of which may be obtained from the Ingersoll-Rand Company, 11 Broadway, New York city or any of their branch offices.

Boston Salesmen To Attend Supper Meet

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., September 6, 1938.—The entire paper distributing trade of Metropolitan Boston has been invited to attend a supper and meeting Wednesday evening under the auspices of the New England Paper Merchants Association at the Hotel Kenmore in connection with the National Sales Crusade. The purpose of the mass meeting is to inspire paper salesmen to stimulate business during September in conjunction with the enormous publicity which will be given to the campaign by newspapers, radio, posters, car cards, window displays, etc.

The speaker will be E. N. Johnston, outstanding in training salesmen, who understands the particular point of view of the paper trade, as he has worked with the Chicago Paper Company and Cleveland Paper Company. John R. Halkyard, of Providence Paper Company, president of the New England Paper Merchants Association, is to preside. A buffet supper will be served.

The meeting promises to be the largest and most representative ever held.

PAPER TRADE
ESTABLISHED 1872
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COMING EVENTS IN THE PAPER INDUSTRY

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY. Fall meeting, Northland Hotel, Green Bay, Wis., September 8-10.

NATIONAL PAPER TRADE ASSOCIATION. Fall convention, Stevens Hotel, Chicago, Ill., September 19-21.

PROSPECTS FAVOR AN ACTIVE FOURTH QUARTER IN PAPER INDUSTRY

In May and June, operating rates in the paper industry began to decline, following a moderate recovery from the extreme lows of January. However, since the middle of June there has been improvement, instead of the normal Summer slump, and prospects according to the Standard Statistics Company, the well known statistical authority, favor an active fourth quarter.

In anticipation of an increase in price, effective January 1, 1938, from $42.50 to $50 a ton, publishers accumulated newsprint stocks of 614,000 tons by the end of 1937. With 75 days' supply on hand (compared with a normal of 35) and consumption declining as the result of depression, newspapers have been very cautious in buying paper. Consequently, shipments of domestic and Canadian mills were 30 per cent under 1937 levels, through July of this year. By the end of that month publishers' stock had been reduced to 343,633 tons, or 52 days' supply.

Additional buying will soon become necessary, and since production (which has been somewhat greater than shipments to date this year, thus increasing mill stocks) is not expected to rise appreciably over the remainder of 1938, inventories throughout the trade should be in fairly good shape by the end of this year.

Although some domestic producers, led by Great Northern, maintained their $48 price for the second half of 1938, most of the industry has been getting $50 a ton all year. Announcement of the 1939 contract price will probably be made within a month or so, and the success of the producers in maintaining the $50 price in the face of adverse conditions this year indicates that a downward revision in prices is unlikely, particularly with the general business outlook improving.

Increased labor costs and the lower rate of operations, as well as the reduced sales volume, have prevented newsprint companies from realizing the full benefits of the higher price effective this year. However, considering the state of general business and the heavy senior capitalizations of most producers, full year 1938 earnings will be fairly good. Given more nearly normal conditions over the remainder of 1938 and in 1939, earnings could show considerable improvement.

Weekly operating rates of the paperboard industry averaged slightly under 60 per cent of capacity through the first half of 1938. Comparable figures on kraft paper production are not available, but new orders were down sharply in the early months of this year. However, there has been moderate contra-seasonal improvement since June, and the current paperboard operating rate is about 65 per cent. Closely allied to the distribution of all types of goods, kraft and board production usually reflects the near term business outlook rather accurately. Thus, there is a good chance that sales will increase over present levels before the end of 1938. Recent firmness in the scrap paper market lends additional support to this prospect.

Prices, however, have been unsatisfactory. Linerboard is now quoted at a weak $42.50, after having been nominally $55 a ton all through late 1937 and early 1938. The actual market was probably lower much of the time. Likewise, kraft wrapping paper is now quoted at $80 a ton, after having dropped quickly from a nominal $90 to $70 several months ago. At the latter price, a fairly good volume of business came in, but the restoration of prices to the $80 level has yet to be tested.

The capacity for producing kraft paper and board has been increased by about 800,000 tons annually, since the end of 1936. There has been some offset through the retirement of northern mills. However, even if the normal 7 per cent increase in consumption, which the industry has been averaging for some years, had developed in 1938, capacity would have been well in excess of demand. Instead, consumption probably will be off some 15 per cent this year, and allowing for a good business recovery in 1939, capacity will still be excessive.

Since the plant investment is large and tonnage an important consideration, there is considerable reason to doubt the maintenance of even current depressed prices. Most of the new capacity is held in strong hands, and it is unlikely that price conditions will get out of control. However, kraft and board

prices may not fully reflect the degree of improvement experienced by general business.

Small sales and lower prices have reduced 1938 earnings, although cheaper waste paper has provided a partial offset. A substantial improvement in sales is likely over the next six to twelve months, but profits will depend upon the success with which the industry solves its capacity problem and maintains prices. Relatively better showings are likely to be made by companies which convert a large portion of their output into finished containers and by independent converting mills.

Effective July 1, reduction of $5 to $14 a ton were made in contract prices for book paper. Spot prices had been declining for some time. The reduction did not bring in a particularly large volume of business at once, but there has been improvement in orders in recent weeks. Advertising activity and demand for book paper usually lags some months behind the course of general business, but by the end of 1938 it would not be surprising to see considerably better sales and higher prices.

H. J. McKenzie Visits Orient

VANCOUVER, B. C., September 3, 1938—British Columbia paper-makers, forced to curtail production for several months because of the Sino-Japanese hostilities and consequent collapse of the Oriental markets, are taking steps to find out just what the sales possibilities in Japan and China are over the next few years.

H. J. McKenzie, manager of Export Sales Company, Oriental selling subsidiary of Powell River Company and Pacific Mills Ltd., the two big B. C. newsprint manufacturers, is now on his way to the Far East on a fact-finding mission. He will visit Japanese and Chinese buying centres, make a personal investigation of the extent of damage done to selling channels and size up future market prospects.

No immediate recovery is looked for in any event, but the importance of the Oriental field to the pulp and paper industry here was felt to justify a thorough enquiry at this time, so that the producers may lay their plans accordingly. If the Orient holds out any hope of swinging back into the customer's lineup at a reasonably early date, the pulp and paper-makers will sit back patiently and wait. If there seems to be no prospect of re-opening on a worthwhile scale, they may be inclined to wipe the Orient off their sales slate entirely for a while and look to other fields.

General feeling among pulp and papermen at Vancouver is that when peace prevails again across the Pacific, the market will open up again on a larger scale than ever. Such a development would be good news to B. C. Pulp and Paper Company, which has closed its two recently-converted rayon pulp plants at Woodfibre and Port Alice largely because of the stagnation of the Japanese market.

Lumbermen expect to share generously in orders from the Far East when reconstruction gets under way. They recall that the biggest volume of orders from Japan followed the earthquake in Tokio and Yokohama. No other timber region is better able to meet the Orient's reconstruction requirements for lumber than British Columbia.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES

Months	1938(c)	1937(c)	1936	1935	1934
January	63.9%	90.3%	76.1%	65.8%	.....
February	68.7%	90.1%	77.9%	70.0%	.....
March	69.6%	90.3%	76.0%	70.5%	.....
April	68.3%	92.1%	82.3%	70.0%	.....
May	69.0%	90.6%	81.6%	69.4%	.....
June	65.8%	87.3%	80.7%	72.3%	.....
July	71.9%	81.8%	77.3%	64.9%	.....
August	76.7%	82.9%	81.5%	70.9%	.....
September	.....	78.6%	80.5%	71.9%	58.2%
October	.....	73.5%	87.6%	75.6%	64.7%
November	.....	61.9%	88.0%	75.3%	61.7%
December	.....	54.5%	85.9%	71.2%	59.6%
Year Average	.....	80.6%	81.3%	70.5%	.....
First 34 weeks	69.0%	88.2%	79.1%	69.1%	.....

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1938		CORRESPONDING WEEKS, 1937	
*July 23	76.2%	July 24	85.9%
*July 30	77.3%	July 31	83.9%
*August 6	73.1%	August 7	82.6%
*August 13	77.1%	August 14	82.1%
*August 20	77.8%	August 21	83.7%
*August 27	79.7%	August 28	83.3%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting, Current Weeks					
Ratio Limits	July 23, 1938	July 30, 1938	Aug. 6, 1938	Aug. 13, 1938	Aug. 20, 1938	Aug. 27, 1938
0% to 50%	78	88	89	80	81	60
51% to 100%	231	220	217	224	207	148
Total Mills Reporting	309	308	306	304	288	208

* Subject to revision until all reports are received.
(c) Basic capacity data have been adjusted to correspond with ratings reported by individual companies.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours", were as follows:

Mos.	1938 (e)	1937 (e)	1936	1935	Mos.	1938 (e)	1937 (e)	1936	1935
Jan.	55%	80%	61%	61%	July	57%	67%	69%	59%
Feb.	61%	86%	67%	67%	Aug.	....	74%	75%	65%
Mar.	60%	87%	68%	67%	Sept.	....	70%	76%	69%
Apr.	57%	89%	70%	61%	Oct.	....	66%	82%	76%
May	58%	86%	68%	61%	Nov.	....	56%	79%	70%
June	56%	75%	68%	65%	Dec.	....	46%	74%	60%

Week end. July 23, 1938—65%
Week end. July 30, 1938—64%
Week end. Aug. 6, 1938—64%
Week end. Aug. 13, 1938—65%
Week end. Aug. 20, 1938—67%
Week end. Aug. 27, 1938—69%

(e) Basic figures revised to include new members of the National Paperboard Assn.

Norwegian Pulp Market Dull

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 31, 1938 — The Norwegian wood pulp market continued very dull during the second quarter of the year, according to a report to the Department of Commerce. A revival in the mechanical pulp market is not looked for until the large British paper combines have fixed their price for 1938.

Mill operations during the early part of the quarter were somewhat curtailed in conformity with the existing quota scheme in the Scandinavian countries. Increased activity and improved prices in the chemical pulp market cannot be looked for until supply and demand are more nearly balanced. There is reported to be much overstocking in many of the consumer countries, some of which are reducing their import quotas. It seems fairly certain that some of the mills will be forced to close down or at least drastically curtail their operations. Indications are that sulphite prices have touched bottom. Some sales for 1939 delivery are reported to have taken place.

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Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

Review Of The Paper Industry Literature

Abstracts Compiled By the Abstracts and Bibliography Committee of the Technical Association of the Pulp and Paper Industry, A. Papineau-Couture, John F. Ohlson, C. E. Peterson and Clarence J. West, Chairman.

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.

Alkaline Processes

Processing Cellulosic Material. Albert D. Merrill, assignor to Chemipulp Process, Inc. Can. pat. 369,226 (Oct 12, 1937).—Fibrous material is saturated with hot sodium hydroxide of sufficiently low concentration to prevent any mercerizing effects, maintained under high hydrostatic pressure for sufficient time to preheat the material uniformly and extract certain of the noncellulose constituents. Excess sodium hydroxide is drained off, the material is treated with hot bisulphite liquor maintained at high hydrostatic pressure but below reaction temperature for a predetermined period, and then digested in the acid liquor. An apparatus is specified.—A.P.-C.

The Present Status of the Pomilio Process for the Manufacture of Pulp. Part Two. P. Waentig. Zellstoff u. Papier 17, no. 12: 538-41 (Dec., 1937). —This article deals with various applications of the Pomilio process to other types of grasses, such as bamboo and esparto. The bleaching of kraft pulp according to this process has been successfully carried out. Straw cooked by the Pomilio process and mixed with other types of pulp has been used in the manufacture of newsprint. Both chemical and physical tests on the finished paper are given showing comparisons favorable to paper made from wood.—J.F.O.

Production of Pulp From Coniferous Wood (Pine) By Chlorination. L. P. Zherebov, G. A. Kan and V. N. Komarovskii. Bumazhnaya Prom. 15, no. 7:8-20 (1937); C. A. 32:2345.—A preliminary report on the pulping of pine wood with chlorine is given. Treating chips with sodium hydroxide (up to ten per cent) at 95° and then with chlorine produced a stock with 25 per cent of unaltered wood. Steaming the chips at 130-140° for 2 hours and then treating the wood at a maximum moisture content of 30 per cent with gaseous chlorine (7 per cent water) at a maximum of 70° for 4 hours gave the best results. At a chlorine consumption of 42-43 per cent (based on over dry wood) a yield of 60 per cent of pulp, containing 6-7 per cent lignin and 6 per cent of unaltered wood was obtained. Approximately the same results were obtained with wood flour. The unaltered fraction can be chlorinated alone or jointly with wood chips with equally good results. The lignin chloride and hydrochloric acid are removed with water at 80° and with one per cent sodium hydroxide at 40°. The product bleached with 1.1-1.3 parts by weight of chlorine gives 88-90 per cent of bleached stock, containing 6-7 per cent pentosans and 77-79 per cent alpha-cellulose and possessing satisfactory mechanical properties. Bleaching at elevated pressure and with aqueous chlorine produced inferior results.—C.J.W.

Production of Cellulose. Juljusz Saft. Fr. pat. 817,852 (Sept. 13, 1937).—Cellulose of superior quality is made by boiling cellulose or cellulosic material such as wood fragments, with an aqueous solution of an alkaline-earth metal hydroxide or ammonium sulphate under ordinary or increased pressure, with the addition of organic nitrogen compounds, such as pyridine, aniline, triethanolamine, or their derivatives, or higher aliphatic alcohols or their derivatives.—A.P.-C.

Pulping Process. Martin Günther. Fr. pat. 816,205 (Aug. 3, 1937).—Straw or other grasses are saturated with a caustic soda liquor in a rotary boiler, air is expelled by steaming, and the charge is then treated with dry superheated steam without increasing the moisture content of the charge. Sulphite or hydrosulphite is added with the caustic soda as reducing substance.—A.P.-C.

Heat Utilization in Sulphate Mills. Alb. E. Nielsen. Papir-J. 26, no. 2: 17-21 (Jan. 31, 1938); B. I. P. C. 8:271.—With reference to Moerch's article on this subject (Papir-J. 25, no. 23:354 (Dec. 15, 1937)), the author draws attention to a fourth recovery system not mentioned in the latter's article, the Helmer de Verdier system constructed by the A. B. Karlstad Mekaniska Verkstad in Sweden. Although little known to date, this system represents in the opinion of many experts the most favorable combination of smelting oven, steam boiler, rotary furnace, and disk evaporators. Calculations are given and supplementary remarks to certain of Morch's statements are made. —C.J.W.

Solution of Chlorinated Lignins in Dilute Alkalies*

By George C. Arnold,[1] F. A. Simmonds[2] and C. E. Curran[3]

Abstract

Five alkalis in aqueous solution, namely, sodium, calcium, and ammonium hydroxides, sodium carbonate and sodium metasilicate were compared quantitatively as to their efficiency for dissolving chlorinated lignin obtained from wood, sulphate black liquor, and sulphate pulp.

Of these alkalis, sodium hydroxide was the most and calcium hydroxide was the least efficient. The other three were approximately equal and intermediate to the others.

Calcium hydroxide apparently forms a relatively insoluble complex with chlorinated lignin as indicated by the precipitation resulting upon the addition of calcium hydroxide to a concentrated solution of chlorinated lignin in sodium hydroxide.

An alkaline extraction of washed, chlorinated pulp removes a fraction of chlorinated lignin that is insoluble in cold water and in hot ethyl alcohol. Even the water-soluble fraction is not completely removable with economically feasible washing practices.

A greater degree of solution of chlorinated lignin from wood was effected by a sodium hydroxide solution at 25 than at 60 deg. C. and its solution in calcium hydroxide solution is just the reverse of this. Chlorinated lignin from sulphate pulp, however, is more soluble in sodium hydroxide solution at 60 than at 25 deg. C.

The trend of commercial pulp bleaching has developed rapidly in the last few years toward multistage processes that utilize a direct chlorination as an initial treatment. In many instances this reaction is allowed to proceed essentially to completion in the acid condition. In one process, however, after a chlorination period of about 10 minutes, enough hydrated lime is added to effect a pH value of between 8 and 9 and the reaction proceeds in an alkaline condition. It is well known that an economy in chlorine and an improvement in pulp quality results when direct chlorination is followed, after a washing with water, by an extraction with caustic soda solutions at an elevated temperature.

The most efficient utilization of interstage chemical treatments will follow, obviously, upon increased knowledge of the bleaching reaction and the reaction products. Fortunately, investigations of this nature are increasing in number (*4, 6, 8, 9*).

One reaction product especially evident in direct chlorination is chlorinated lignin. One fraction of it is water soluble (*9*) and thus removable by ordinary washing. Another fraction requires an alkaline extraction to effect its removal. There are, however, no published data comparing the efficacy of economically applicable alkalis as extractives. Numerous investigators have worked with chlorinated lignins but they were chiefly concerned with characterization of the compounds.

It is with the water-insoluble fraction of chlorinated lignin that the experimental work reported herein deals. The objective was to compare the efficiency of several alkalis in effecting the solution of chlorinated lignin obtained from: (1) longleaf pine wood, (2) a sulphate pulp made therefrom, and (3) the corresponding black liquor.

Literature

Chlorination of cellulosic materials was apparently investigated first by Cross and Bevan (*1*) during the latter part of the nineteenth century. They isolated a compound from jute fibers which they designated as "lignone chloride." This had a chlorine content of 26.8 per cent and was assigned the empirical formula $C_{19}H_{18}Cl_4O_9$.

Heuser and Sieber (*3*) studied chlorination of moist spruce sawdust. Analysis of this material showed only 9.47 per cent of chlorine in organic combination. On extraction with absolute alcohol, a product containing 22.7 per cent of chlorine was obtained in yield of 7.1 per cent on the weight of dry extractive-free wood. Characterization reactions applied to this product did not yield a definite aromatic compound.

Powell and Whittaker (*7*), working with flax lignin prepared by the alkali process, studied the chlorinated lignin prepared by chlorination in carbon tetrachloride. They obtained a compound to which they assigned the structure, $C_{40}H_{20}O_8Cl_{12}(OCH_3)_2(OH)_5CHO$. One-half of the chlorine in chlorolignin was readily eliminated by cold alkali treatment; the other six atoms, more firmly held, were believed to be substituted for hydrogen on an aromatic nucleus.

Kress and Voigtman (*6*), investigating chlorination bleaching, prepared chlorinated lignins by chlorination both in carbon tetrachloride and in water from various types of isolated lignin. The lignin chlorinated in carbon tetrachloride contained almost twice as much chlorine as that chlorinated in water but was only very slightly soluble in a 5 per cent potassium hydroxide solution whereas the lower chlorine content lignin was completely soluble. Chlorination in water of lignin isolated from a sulphite waste liquor resulted in a product containing 18.6 per cent chlorine. The solubility characteristics of the chlorinated lignins resulting from chlorination in water appeared to be similar to those of the chlorinated lignin in chlorinated kraft pulp.

Waentig (*9*), in an extensive research, studied the behavior of lignin and chlorinated lignin in the preparation of pulp by the chlorine process. He found

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* Presented before the Technical Association of the Pulp and Paper Industry, February 22, 1938, New York City.

[1] Student Assistant.
[2] Member TAPPI, Associate Chemist.
[3] Member TAPPI, Principal Chemist, Forest Products Laboratory, Forest Service, U. S. Dept. of Agriculture, maintained at Madison, Wis., in cooperation with the University of Wisconsin.

The experimental work reported herein was done by George C. Arnold as the thesis requirement for the degree of Master of Science at the University of Wisconsin, June, 1937.

about one-half of the chlorinated lignin formed to be water soluble. The water insoluble fraction was soluble in sodium hydroxide but to a lesser degree at higher temperatures; it was precipitated by calcium hydroxide.

Since the work here reported was completed there has appeared a characterization of chlorolignin by Jansen and Bain *(5)*. They deal principally with an alcohol lignin chloride, the initial source of which was a chlorination of air-dry spruce sawdust in methyl alcohol. They did, however, chlorinate moist sawdust under various conditions and extracted the product with alcohol. The chlorine content of such chlorinated lignins ranged from 14.6 to 26.9 per cent.

Preparation of Chlorinated Lignins

Chlorinated Lignin From Longleaf Pine Wood

The longleaf pine wood in the experiments herein reported was reduced to sawdust and then extracted for 5 hours with alcohol-benzene (1:2) solution to remove such compounds as resins and terpenes which might contaminate the final product. After removal of the organic solvents by drying, the extracted wood, suspended in water, was placed in an upright metal cylinder containing an inner draft tube and equipped with a motor-driven propeller for agitating the suspension. Chlorine gas was passed into the suspension, the chlorination extending over a period of 1 hour. During chlorination the wood changed from a light-yellowish color to a bright-orange.

After chlorination, the liquid was filtered off and the chlorinated wood was washed with water until free from all traces of acid and then air dried. As only the water-insoluble chlorinated lignin was desired, no attempt was made to recover the water-soluble fraction. The air-dried chlorinated wood was extracted with 95 per cent ethyl alcohol.

The alcoholic extract was filtered off and concentrated under reduced pressure giving a deep brown-colored solution. Complete evaporation, even under reduced pressure, gave an unsatisfactory product. It formed a hard, lustrous, black solid which had a strong odor somewhat like chlorine and upon grinding formed a dark brown powder. Apparently decomposition was occurring at room temperature. When the concentrated alcohol extract was poured into water (1 part of extract to 10 parts of water), a rather flocculent buff-colored precipitate formed. Under these conditions about one-half of the total lignin chloride in solution was precipitated. This precipitate was readily filtered by suction and was dried in air. Direct exposure to sunlight or oven-drying caused decomposition, but when air dried at room temperature out of direct sunlight, no decomposition was noticed. About 30 grams of a light buff-colored powder were obtained from the treatment of about one kilogram of the longleaf pine wood.

The product had no melting point; noticeable decomposition began at 140 deg. C. The product had a chlorine content of 14.2 per cent. It was soluble in alkaline solutions, alcohol, acetone, glacial acetic acid, fusel oil, ethylacetate, dioxan, and benzaldehyde, and very slightly soluble in carbon tetrachloride, chloroform, ether, and glycerol.

Chlorinated Lignin From Lignin Precipitated From Kraft Black Liquor

The preparation of chlorinated lignin from kraft black liquor entailed considerable treatment of the liquor to remove objectionable impurities. A portion of the alkaline black liquor was filtered, heated to 80 deg. C. and then acidified with 6 *N* hydrochloric acid. A heavy precipitate separated immediately which was filtered and washed successively with dilute hydrochloric acid and water. This material seemed to take up a large amount of water, which caused some difficulty both in filtering and drying, especially the latter. It, like the chlorinated lignin from wood, had to be dried at room temperature and out of direct sunlight. The dried material was dark green and had the strong odor of the sulphur compounds (mercaptans) characteristic of kraft black liquor. Fats, resins, oxyacids, saccharides, and lactones may also be present since they form about 50 per cent of the total solid organic content of kraft liquor.

The lignin was dissolved in a minimum of hot 95 per cent ethyl alcohol and filtered. It was about 85 per cent soluble. The concentrated solution was precipitated in water as in the case of the chlorinated lignin from the wood. The final product was a brown powder which still retained a faint odor of mercaptans.

This lignin was dissolved in hot acetone and the concentrated solution precipitated in water made slightly acid with hydrochloric acid since in unacidified water the precipitate was colloidal. The precipitate was flocculent and light brown in color both before and after drying. It was also odorless. This product was considered sufficiently pure for chlorination.

The finely ground material was suspended in water (2 g. of lignin per 100 cc. of water) and chlorine gas was bubbled through the solution for about 12 hours, the lignin assuming a bright orange color.

The product was also chlorinated in alcoholic solution for comparative purposes. The reaction was rapid, strongly exothermic, and caused a higher degree of chlorination than that obtained by chlorination in water. Because other investigators have found that chlorination in mediums other than water yields a type different from that produced in bleaching operations, treatment in water was deemed necessary in spite of the slowness and difficulty in obtaining uniform chlorination of the particles. The material was then filtered, washed with water, dried, dissolved in hot alcohol and precipitated with water slightly acidified with sulphuric acid to prevent a colloidal form of precipitate. The dried precipitate was a bright orange-colored powder. It had a chlorine content of 18.6 per cent, whereas the chlorinated lignin formed on chlorination in ethyl alcohol contained 23.2 per cent chlorine. The chlorine content of 18.6 per cent is the same as obtained by Kress and Voigtmann (*6*) for both cuprammonium and sulphite waste liquor lignins after chlorination in water.

Chlorinated Lignin From Kraft Pulp

In the pulping process a large part of the original lignin of the wood is removed and recoverable as previously indicated from the spent cooking liquor. From 3 to 25 per cent of the original lignin remains in the unbleached pulp. It seems likely that this

lignin is different from that in the original wood and also from that in the black liquor. A determination of the solution of the chlorinated form of this lignin by alkaline solutions would be of more practical value than that of the other two types. It was therefore desired to extract such a material from the pulp in an unchanged form. A trial of various unreactive solvents failed, however, to effect a satisfactory extraction from the pulp after chlorination. Alcohol, acetone, carbon tetrachloride, dioxan, and similar solvents were useless. The only materials that had possibilities were those with alkaline properties, which apparently reacted with the chlorinated lignin. Alcohol made basic with ammonia, pyridine, or other amine was satisfactory, but such solutions were so dilute that very large amounts would be necessary to obtain even a small amount of chlorinated lignin.

Since it was evident that no solvent was available for isolating the product in a more or less unchanged form, it was decided to extract the chlorinated pulp with sodium hydroxide solution, acidify the alkaline extract, and chlorinate the material precipitated upon acidification. For this extraction the equivalent of 15 pounds of chlorinated pulp was treated for 1 hour with 6 per cent of its weight of sodium hydroxide at about 4 per cent consistency and 60 deg. C.

The alkaline extract was filtered through a stoneware filter. The filtrate was acidified with sulphuric acid to a pH value of about 4 and a brown gelatinous precipitate formed after standing. This precipitate was difficult to filter, and after it was dry, had to be scraped from the filter paper, which resulted in a mixture of precipitate and fiber. It was redissolved in alkali, filtered to remove the fibers, and was then treated with chlorine gas passed directly into the alkaline solution. A heavy, reddish-brown precipitate formed very rapidly. On filtration and drying a small amount of an orange-brown powder was obtained. This was treated with hot, 95 per cent ethyl alcohol and filtered. About half of the material dissolved. The concentrated alcoholic solution was precipitated in water made slightly acid with sulphuric acid. The filtered and dried precipitate was very similar in appearance to the other chlorinated lignins. The yield was extremely low, only 5.5 grams being obtained from the 15 pounds of pulp.

The difficulty of removing chlorinated lignin by washing was illustrated in another experiment in which 800 grams of pulp were chlorinated and then washed with approximately 250 pounds of tap water. The washed pulp was left in contact with about 5 liters of water for approximately 70 hours and then filtered. The filtrate was reddish-brown and darker than the alkaline extract had been in the previous case. The pH value of the filtrate was 5.7. A chlorine determination revealed approximately ten times as much chlorine in this extract as in an equivalent amount of tap water. Titration with potassium permanganate solution, both in an acid and alkaline medium showed that some reducing substance was present. Thus, titration with 0.1 *N* potassium permanganate in alkaline medium required 3.9 cc. of permanganate for 20 cc. of extract and in an acid medium, the required amount was 1.45 cc.

It was obvious that a washing treatment of the chlorinated pulp with water under conditions ordinarily considered as thorough failed to remove completely even the water-soluble chlorination reaction products. The result observed may be due, however, to some change occurring in a water-insoluble fraction under the conditions of extended diffusion.

Chlorine Determination

The method employed for determination of the chlorine content consisted essentially of decomposing the chlorinated lignin with nitric acid, precipitating the chlorine liberated as silver chloride, and determining by titration with standard potassium thiocyanate, how much standard silver nitrate had been used.

The silver nitrate was standardized against pure sodium chloride (acidified with nitric acid). Sodium chromate was used as the indicator. The potassium thiocyanate was standardized against the silver nitrate solution in a nitric acid medium. A concentrated solution of ferric ammonium sulphate (ferric alum) was used as the indicator.

One-half gram of chlorinated lignin, 20 cc. of 1:1 nitric acid, and an excess of 0.1 *N* silver nitrate solution was refluxed for 5 hours, cooled, 5 cc. of ferric alum indicator added, and the solution titrated with standard potassium thiocyanate. The actual amount of silver nitrate used was thus determined, and the equivalent amount of chlorine and the percentage of chlorine in the chlorinated lignin calculated.

This method of chlorine analysis has been found in work conducted at the Forest Products Laboratory to compare favorably with the Stepanoff and Carius methods.

Solution in Alkalis

The alkaline solutions selected were sodium hydroxide, sodium carbonate, calcium hydroxide, ammonium hydroxide, and sodium metasilicate.

It was thought a potentiometric titration might indicate completion of the reaction between alkali and chlorinated lignin and thus serve as the end point of solution. With this in view, several titrations were made using a Youden capillary glass electrode apparatus. A known weight of chlorinated lignin was dissolved in 95 per cent ethyl alcohol and titrated with standard sodium hydroxide. The usual plot of pH values against the amount of alkali added resulted in a fairly smooth curve with no evidence of an "end point" of a reaction. A similar titration and plot of data with purified lignin isolated

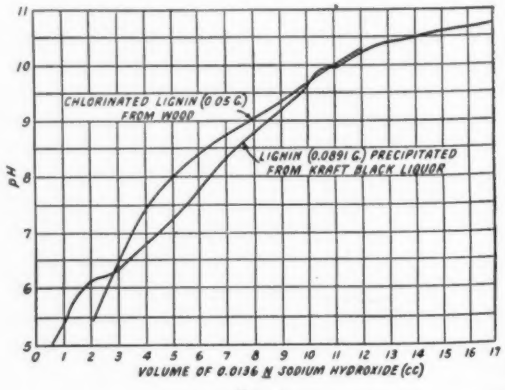
CHLORINATED LIGNIN (0.05 G.) FROM WOOD
LIGNIN (0.0891 G.) PRECIPITATED FROM KRAFT BLACK LIQUOR
pH
VOLUME OF 0.0136 N SODIUM HYDROXIDE (cc)

FIG. 1
Potentiometric Titration of Lignin and Chlorinated Lignin with Sodium Hydroxide.

from the kraft black liquor produced a curve with two definite breaks, one slightly above phH 6 and another just below pH 10. These curves are reproduced in Fig. 1. The lignin solution, brown colored at all times, became noticeably darker in the vicinity of the second break. The apparatus used was not well adapted for titration and therefore the potentiometric method should not be condemned as useless until improved equipment has been tried. For this reason and because they are essentially fragmentary data no attempt is made to interpret them here. It is recognized, however, that extended potentiometric data might prove of considerable value in determining the reactions between alkalis and lignin before and after chlorination.

A gravimetric determination involving the use of a filter-stick technique described by Emich (*2*) was finally selected. This involved running a measured volume of a standard alkali solution into a weighed amount of chlorinated lignin, stirring, filtering, and determining the weight of undissolved residue.

METHOD

The "beakers" used were shell vials approximately 15-cc. in capacity. A clean dry beaker, filter stick, and about 100 milligrams of chlorinated lignin were weighed together. A standard alkaline solution (approximately 0.01 *N*) was measured into the beaker, the amount of solution added always being less than necessary for complete solution of the material. The mixture was stirred for about 10 minutes, after which time the beaker and contents were centrifuged for several minutes to settle all suspended material which otherwise tends to clog the filter stick. The supernatent liquid was filtered off through the filter stick by suction, the residue washed with about 5 cc. of water, centrifuged again and filtered. The beaker, its contents, and the filter stick were then dried as indicated in the following paragraph, cooled in a desiccator and weighed. The weight of chlorinated lignin dissolved by the alkaline solution was found by difference.

The drying apparatus consisted of a hard glass tube about 4 cm. in diameter and about 50 cm. in length, supported in a horizontal position. The center portion of the tube where heat was applied was protected with a wire gauze. Air is drawn through the tube by means of a water vacuum pump, the incoming air passing through a calcium chloride tube. When drying the residues, the beaker and filter stick were placed in the tube and the stick was connected to the suction which was started after the heating of the wire gauze had begun. The temperature was not allowed to exceed 60 deg. C. in order to avoid decomposition. Air passed through the calcium chloride tube, was heated in the large tube, passed down into the beaker and out through the filter stick. Fifteen minutes was generally sufficient drying but the character and amount of precipitate influence the time.

TABLE I.—AMOUNTS OF CHLORINATED LIGNIN DISSOLVED PER GRAM OF ALKALI IN AQUEOUS SOLUTION

Source of lignin	Chlorine content (Chlorination in water suspension), Per cent	Grams of chlorinated lignin dissolved per gram of alkali						
		NaOH		$Ca(OH)_2$				
		25 deg. C.	60 deg. C.	25 deg. C.	60 deg. C.	Na_2SiO_3, 20 deg. C.	Na_2CO_3, 25 deg. C.	NH_4OH, 25 deg. C.
Longleaf pine wood	14.2	8.98	6.58	1.84	2.94	6.32	4.50	5.14
		8.83	6.41	1.75	2.65	6.18	4.54	5.14
		8.85	...	1.66	...	6.01	...	...
Average		8.89	6.50	1.75	2.80	6.17	4.52	5.14
Kraft black liquor from digestion of above wood.	18.6	6.90	5.21	2.51	...	3.06	3.94	...
		6.90	5.35	2.45	...	3.06	3.93	...
		6.71	...	...	...	...	...	...
Average		6.79	5.28	2.48	...	3.06	3.94	...
Longleaf pine kraft pulp from above wood	5.5	6.70	7.36	2.17	...	3.66	3.14	...
		6.72	7.42	2.32	...	3.82	2.94	...
		6.46	7.29	...	...	...	...	...
		...	7.28	...	...	...	...	...
Average		6.63	7.34	2.25	...	3.74	3.04	...

[1] The concentrations of the alkaline solutions were definite and ranged between 0.01 to 0.02 N.

Results and Discussion

For purposes of comparison the amount of chlorinated lignin brought into solution was calculated to the basis of 1 g. of alkali. The values are given in Table 1.

The results afford a fair indication of the value of the method. In its favor may be said that it is fairly rapid, requires no expensive apparatus and may be carried out with relatively small amounts of material. Like all procedures in the developmental state, this method can be improved. For example, a more standard type of filter stick would be a worthwhile improvement. A better method of heat control in drying operations would improve the ease of operation and also lessen the error. The error of the method is probably about ±3 per cent.

Sodium hydroxide proved to be the most and calcium hydroxide the least efficient of the five alkalis used for dissolving the chlorinated lignins. Sodium metasilicate, sodium carbonate, and ammonium hydroxide are approximately equal in effectiveness and intermediate with the first named pair.

The chlorinated lignins vary in their resistance to solution depending on the source, an apparent exception to the general trend being noted, however, where calcium hydroxide is the alkali. The order of increasing resistance to solution is chlorinated lignin from wood, kraft black liquor, and kraft pulp. There is no apparent relation between resistance and chlorine content. The chlorinated lignin from the wood was more resistant towards calcium hydroxide than were the other two.

Calcium hydroxide must be viewed somewhat as a special case because of evidence of the formation of a relatively insoluble calcium complex. It was observed that the undissolved residue after treatment with calcium hydroxide solution differed in appearance from that remaining after treatment with sodium hydroxide. It was very dark brown, whereas the other material was but slightly altered in appearance when compared with the original chlorinated lignin. The formation of a calcium complex is indicated by the fact that the addition of a calcium hydroxide solution to a concentrated solution of chlorinated lignin in sodium hydroxide resulted in the formation of a dark brown flocculent precipitate. Waentig (*9*) has reported a similar behavior. It is likely that the residue remaining after treatment of a chlorinated lignin with calcium hydroxide solution contained calcium. That, however, is an inherent factor in its relatively low efficiency as an extractive. These observations also lead to speculation as to possible effects when lime is added to a chlorination stage.

The relation between the temperature of the alkaline solution and its effectiveness also appears to depend on the source of the chlorinated lignin with calcium hydroxide again being noted as an exception. For example, sodium hydroxide was more effective at 60 than at 25 deg. C. in dissolving the chlorinated lignin from the pulp. This was the reverse of results obtained with chlorinated lignin from either the wood or the black liquor. Calcium hydroxide was more effective at 60 than 25 deg. C. in the case of the chlorinated lignin from wood.

The reactions involved in the solution of chlorinated lignin in alkaline solutions are not known and probably will not be until the compound or compounds are completely characterized. Unpublished data of the Forest Products Laboratory indicate the presence of carboxyl in chlorinated lignin prepared from the chlorination of lignin isolated from wood by the sulfuric acid method. It is also known that the compound loses a part of the combined chlorine upon treatment with an alkaline solution. The presence of the carboxyl group would indicate neutralization to comprise at least a part of the reaction in alkaline solution. The low solubility of the compound in calcium hydroxide solution could be readily accounted for on this basis by assuming the formation of a relatively insoluble calcium chlorolignin. Such observations as these suggest numerous factors that would profitably bear investigation.

Literature Cited

(1) Cross, E. J. and Bevan, C. F. *J. Chem Soc.* 38, 666 (1880); 55, 199 (1889); *J. Soc. Chem. Ind.* 12, 104 (1893).
(2) Emich and Schneider. Microchemical Laboratory Manual p. 68-75, Wiley, (1932).
(3) Heuser, E. and Sieber, R. *Z. Angew. Chem.* 26, 801-06 (1913).
(4) Hisey, W. O. and Koon, C. M. *Paper Trade J.* 103, No. 6, 36-43 (1937).
(5) Jansen, G. V. and Bain, J. W. *Can J. Res.* 15, No. 7, 279-294 (1937).
(6) Kress, O. and Voigtmann, E. H. *Paper Trade J.* 97, No. 7, 42-44 (1933).
(7) Powell, W. J. and Whittaker, H. *J. Chem. Soc.* 125, 357 (1924); 127, 132 (1925).
(8) Samuelson, Sigurd. *Proc. Tech. Sec. Papermakers' Assoc. Gt. Brit. & Ire.* 17, Pt. 2, 293-319, (1937).
(9) Waentig, P. *Z. Angew. Chem.* 41, 493-98, 977-80, 1001-05 (1928).

Beater Room Control*

By W. F. Hoffman[1]

Abstract

Beater room control consists of keeping a record of all beater furnishes and of any changes together with reasons, and the making and recording of certain desired tests and measurements. A general procedure is given for carrying this out in a practical way under technical supervision. No actual values are given for optimum operating conditions as it is not believed optimum conditions for one mill would necessarily be optimum conditions for another. The value of such a system of beater room control cannot be valued in dollars but the accurate knowledge of how the product was manufactured, justifies any reasonable expense.

Some time ago the writer gave a paper on "Beater Room Control" at a Superintendent's meeting. At that time an attempt was made to present this problem from the viewpoint of the operating supervision. In this paper an attempt will be made to discuss beater room control more from the viewpoint of the technical man in the mill. However, it is hoped that sight has not been lost of the practical operating aspect of this problem.

It must be conceded at the outset of such a discussion that the entire setup of any sort of beater room control must be a combination of technical control and common sense operation. First, it must be fundamentally sound from the technical side and secondly, and of equal importance, it must be simple and practical and produce results that justify the additional expense incurred in carrying it out.

There are many phases of work that can be considered as beater room control but which space will not permit including specifically in this paper. For this reason an attempt will be made to build up a frame work into which numerous and various details can be fitted.

The phase of beater room control which will be discussed consists of the routine work of one or more men on each shift or tour, the number depending upon the type of mill, the equipment, the work which is to be done and the personnel of the beater room supervision, their duty being solely that of making and recording certain desired tests and measurements, of keeping a record of all furnishes and of any changes, together with the reason for the changes. This work must be carried out under technical supervision. In most mills this can best be done by the technical department or laboratory. However, such a system of beater room control can be worked out under the beater room supervision provided they have the necessary technical training, and besides this, have the necessary time to work out the numerous problems which are continually coming up.

A system of beater room control may cover a wide range of tests and measurements. The tests, measurements and records may start as far back as the pulp mill where the properties of the pulp are determined. It will include all tests and measurements made in the beater room. It may include some tests and measurements made in the machine room, and it may even include the routine sampling and testing of sewers for losses. The responsibility of those in charge may likewise cover a wide range depending on the conditions as they exist in any specific mill.

In this paper tests and measurements will be described which are useful and worth while from a practical operating viewpoint as a part of beater room control. General forms will be described for keeping a record of order furnishes as well as forms for keeping other operating records and the value of such records pointed out. No attempt will be made to deal with theoretical problems or those which may be of laboratory interest or value only. No attempt will be made to describe all of the tests and measure-

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ments which technical men have at their command and which may be applied to beater room control.

As the author is naturally better acquainted with conditions in the mills of the Northwest Paper Company, some of the tests and measurements used there will be described. It should be clearly understood that the author does not believe all of the tests and measurements made in our mill, or all of the tests and measurements which will be referred to are necessary or even of interest to another mill, while some tests and measurements which would be of value to them would be of no particular interest or value to us. The same holds true to a certain degree, at least, for the method in which any test or measurement is made. The nature of the test or measurement made by any mill would depend on the grades of paper made, pulp used, the mechanical setup and most of all, on the personnel of the beater room supervision. After all, the final results are what we are after and the exact method of producing them is not so important.

The absence in this paper of reference to published work on beater room control does not mean that they have been ignored or overlooked, but rather it is hoped that the space necessary to present an historical background for beater room control can be more profitably spent in subsequent discussion.

A short description will be given of the tests and measurements referred to. The details of most of these may be readily found in published standard methods of analysis. In-so-far as practical, the methods used for making the various tests and measurements used in beater room control should be the standard methods of the Technical Association of the Pulp and Paper Industry, or should be taken or adapted from some other reliable source.

It will be noted in the subsequent description of the various phases of a beater room control system that no values are given as to the proper consistency, color, pH, acidity, freeness or whatever it may be. It is not believed that the conditions which we may have found best for operation at our mill would produce the best results in another mill. However, the basic principles are the same even though the values may differ.

Control in Hypothetical Mill

In order that we may go more into detail without actually describing the operation of any particular mill we consider a hypothetical mill. A practical beater room control system will be described. The most complicated conditions usually encountered will be used.

We will assume that this mill makes all of the pulp used. The pulp is delivered to the beater room in slush form or in laps (wet or dry) or both. There is unbleached sulphite and bleached sulphite, soda or sulphate pulp, unbleached kraft and bleached kraft, and finally, a paper stock plant. The brightness and color of this pulp is not always uniform nor is it always thoroughly washed.

The beater room of this mill has a charging floor over the beaters on which are measuring tanks for pulp, alum, size and clay. The equipment of the beater room and that part of the machine room with which we are concerned, consists of beaters, beater chests, jordans, machine chests, save-alls, a well closed white water system and some sewers.

Pulp Color

Although the pulp mill has graded the pulp as to color before it comes to the beater room, brightness tests are taken on the stock in the pulp decker chests every two or three hours. This enables the beater engineers to hold their color much more uniform, as they know of any changes in the pulp before it gets to the beater room. This color, or rather brightness, of the pulp is obtained by measuring its brightness in the form of a dried hand sheet by means of a General Electric reflection meter as recommended by the Institute of Paper Chemistry. To insure accurate results, extreme care must be taken in making the hand sheet. The sheet mould and the felts must be clean. A sheet mould and felts which have been used for color matching work will throw a hand sheet off color or shade even after being thoroughly washed.

Pulp Consistencies

At the same time a consistency determination is made of the stock in the decker chest so that the volume of stock required for any desired amount for a beater furnish can be calculated. The consistency of a pulp slurry can be quickly and accurately determined by means of a centrifuge. A known weight of slurry is centrifuged for a given time and the pad weighed wet. From previously determined values, the weight of dry pulp can be readily obtained. This method is empirical but satisfactory. The other method, of course, is to actually dry every sample. To obtain reliable results, precautions must be taken in sampling the decker chests. A study of stock circulation in the decker chest must be made and a proper sampling point chosen to obtain a true and uniform sample of stock from the chest.

Degree of Washing

Color trouble or foam may be encountered if the bleached sulphite pulp is not sufficiently washed. To guard against this, a chloride determination is made on the stock in the decker chest every two or three hours. This test is made by determining the amount of chlorides in the pulp slurry. A relatively high chloride content indicates poor washing while a low chloride test indicates good washing.

The degree of washing of the unbleached pulp is determined by means of a pH determination. A relatively small amount of cooking liquor remaining in the pulp can be detected by this method. The colorimetric method of determining the pH of the unbleached pulp slurry is satisfactory.

The unbleached kraft is tested for thoroughness of washing by titrating the slurry for total alkalinity. The question is often asked as to why a total alkalinity determination is made in place of a pH determination. The reason for this is that the stock when in the beater will normally be neutralized to a pH of 6.0 or less. If the alkalinity is caused by caustic, the slurry will have a higher pH but may actually contain very little total alkali, while a slurry containing relatively large amounts of carbonates may have a lower pH but actually contain much more total alkalinity.

Broke Measurement

The broke is worked up in broke beaters and furnished to the beaters in slush form. To enable the beater room control man to accurately calculate the volume of this broke slurry required for any particular beater furnish, a consistency determination is

made on the stock or slurry in the broke chest every two hours. The same precautions in sampling must be taken here as for the sampling of the pulp slurry in the decker chest. Due to the variations in clay content, of the fiber composition and of the freeness of the broke slurry, more accurate results may be obtained by actually drying out the samples and weighing the dried pad of pulp than by centrifuging and weighing the wet sample as described for determining the consistency of the stock in the pulp chests. A fiber analysis is made on a composite of the samples from the broke chest taken for consistency. These results are used to check on the quality of broke furnished. This information can also be used by the cost or accounting department. This is a problem encountered in mills where several grades of pulp are used and various grades of paper manufactured.

With this information at hand the correct volume of each pulp can be calculated for any particular furnish, knowing, of course, the beater capacity. The sum of the volumes of each pulp necessary for the beater furnish may be more than the capacity of the beater, especially when the consistency of one of the pulp slurries is low or when a large volume of clay suspension is used. In such a case it is necessary to add some lapped or dried pulp and less of the same grade of pulp in the slurry form.

Clay, Alum and Size

The clay, alum and size are all added to the beater in the form of a solution or suspension. To insure the addition of correct amounts, consistency determinations are made on each of these on composites made from samples collected at regular intervals during the day. If any trouble is encountered or variations occur in the finished paper which may be caused by the addition of incorrect amounts of clay, size or alum, consistency tests are made on individual samples.

Clay suspension consistencies may be estimated by means of an hydrometer. However, for accurate determinations, a unit volume of the suspension should be dried and weighed. At times, it may be of value to determine the total acidity or alkalinity of the clay suspension. The strength of the alum solution may be determined by measuring the specific gravity of the solution. The strength of the size emulsion can be determined by measuring its specific gravity. However, if a very dilute size suspension such as two per cent is used, it may be necessary to actually dry a sample and weigh the size to obtain sufficiently accurate results.

We must remember that for all of the determinations where specific gravity is used, this method is empirical and curves must be prepared from specific gravity data and from actual total solids determinations. The temperature must always be adjusted to that used when the consistency-specific gravity measurements were made or accurate temperature corrections must be determined. In general, it is more satisfactory for the laboratory to make up their own curves or tables from solutions or suspensions as they have them in their mill and according to their particular procedure, than it is to use curves or tables made up in some other mill.

Control of Furnish

The beater now being loaded, let us consider for a moment just what we expect to get for all of this trouble. First, it is necessary to have such accurate data when furnishing a beater with slush stock or slush stock and dry pulp and with solutions or suspensions of clay, alum and size to insure the furnishing of the beater as called for on the beater room furnish sheet and to insure a uniform furnish in each beater.

In order to do this work accurately, it is necessary to have a man on each shift who is responsible to your technical director, chief chemist, or beater room superintendent, and make his job not one of being responsible for what the beater room supervision does, but have the beater room supervision make all furnish changes through this man. He, then, is alone responsible for giving orders in terms of cubic feet or any other units, the amount of pulp slurry, loads or fractions of loads of pulp laps or pounds of dry pulp and gallons of clay, size and alum as determined from the amount called for on the beater room furnish, and from the consistencies of the various slurries, solutions and suspensions. He is likewise, then, alone responsible for the accuracy of all records of materials used for any particular order. The beater room supervision should be responsible for carrying out the orders of the beater room control man.

The accuracy of such a system of beater room control is demonstrated in our mill at Cloquet, where we are checking on our pulp productions and the amount of pulp used as totaled from the beater room control records within two or three per cent at the end of each month, and for a period of several months, within one or two per cent. Our non-fibrous materials used, as recorded by this beater room control record, check very closely with our actual inventories.

A record is kept of the exact furnish used on the start of each order and of any changes made in the furnish at any time during the run. The record includes what change was made, the reason for making the change, at what time the change was made and the name of the individual authorizing the change. A record is also kept of the number of beaters of

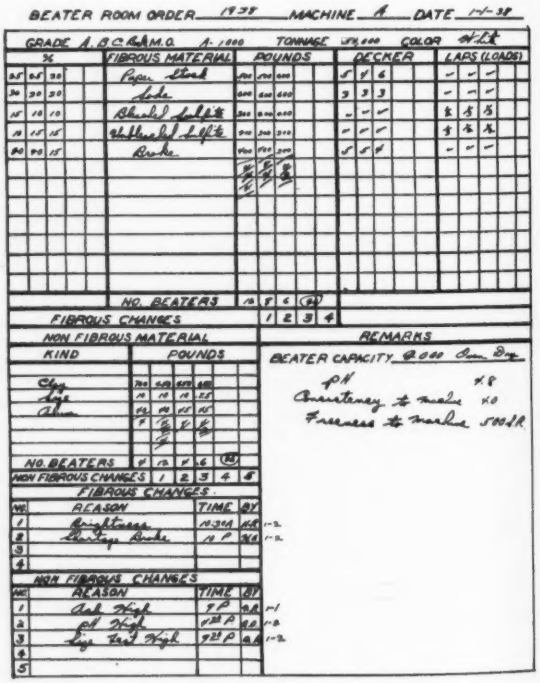


FIG. 1.

each furnish. Such a record form is shown in Fig. 1. This form, as well as Fig. 2, has been filled out to illustrate the various records and changes which have been discussed.

Before the beater is dropped, a pH determination is made on the stock in the beater to be sure the proper amount of alum has been added. If alum or other materials which influence the pH of the stock are added after the beater is dropped, this can be controlled by determining the pH of the stock at any subsequent convenient point.

The pH values may be determined by using a hydrogen, a glass or other type of electrode. However, for beater room control, colorimetric methods may be used with sufficient accuracy except in cases where deep colored paper is being made. The colorimetric method is rapid and does not require skilled operators or supervisors as is desirable, if not necessary, when using potentiometric methods.

The total acidity of the pulp slurry or of the white water is measured by titrating a certain volume of pulp free water from a beater or of white water with standard alkali using phenolphthalein as an indicator. The results may be expressed in parts per million of sulfuric acid or in any other convenient units.

As a check on the calculations of the beater room control man and to be sure that the beaterman is carrying out his orders correctly, a consistency determination should be made on the contents of about every sixth beater.

Especially in mills where there are no consistency regulators ahead of the jordans, it is desirable to make consistency determinations every two or three hours on the stock in the beater chest. This serves as a guide to the man dropping the beaters and is of real value for orders where the jordaning of the stock is important.

As a further contribution to the cause of uniformity, a consistency determination and a freeness test should be made about every two hours on the stock going to the paper machine. Regardless of the grade of paper being run, such measurements are of great value to the man responsible for regulating the refining equipment as well as being a guide to the machine tender.

A total acidity and a pH determination are made and the temperature taken every hour on the tray water. A record form for recording the results of several of these tests and measurements is shown in Fig. 2.

BEATER TESTER: *I*

NAME OF GRADE *ABC Book* ORDER NO *A-1000* DATE *1-1-38*

TRAY WATER				BEATERS							TO MACHINE			REMARKS
Tray	pH	Acidity	Temp	Time	No.	pH	Size (lbs)	Alum (lbs)		% Cons	Freeness	% Cons	Temp	
1 P	6.7	10	2		1	6.7	10	50			0.70	3.0	15	
2 P	6.7	9.6	2		2	6.8								
3 P	6.8	7.0	2		3	6.7					0.65	0.9	15	
4 P	6.8	7.0	2		4	6.8				6.8				
5 P	6.8	10.0	2		5	6.8					0.75	0.9	15	
6 P	6.7	9.8	2		6	6.6								
7 P	6.8	9.0	2		7	6.6				6.9	0.70	3.1	15	
8	6.9	9.0	2		8	6.6								
9 P	6.8	9.1	2		9	6.8					0.80	3.0	15	
10 P	6.8	9.5	2		10	6.8								
11 P	6.8	9.5	2		11	6.6					0.70	3.1	15	
12 P	6.8	9.0	2		12	6.6				6.8				
13 P	6.8	9.7	2		13	6.6					0.75	3.1	15	
14 P	6.8	9.0	2		14	6.8								
15 P	6.8	10.0	2		15	6.8					0.65	3.1	15	
16 P	6.8	9.8	2		16	6.8								
17 P	6.8	10.0	2		17	6.8				7.0	0.60	3.0	15	
18 P	6.8	9.8	2		18	6.8								

FIG. 2.

OTHER TESTS

There are several other tests which may be made a part of such a beater room control. If the water used in the mill has been treated with alum and filtered, a pH determination should be made on it every two or three hours to determine any change and to note and correct any changes in operations caused by such changes.

If the mill has size tubs, the testing of the solution used in the size tub may be part of this beater room control. It is desirable to have consistency determinations made and viscosity and temperature recorded about every three hours. Any standard method of determining viscosity may be satisfactorily used. The temperature must always be adjusted to that used for a standard before either viscosity measurements or specific gravity determinations are made. A good temperature to use as the standard is the average temperature of the solution as delivered to the tub.

Finally, we may consider the sewer loss determinations as part of beater room control. If the sewers from the machines and beater room are equipped with automatic sewer samplers and level recorders, it is an easy matter to accurately determine the stock lost in the sewers. If both fiber and ash tests are made it is often simple to determine the source of any large losses if there has been an order change during the sampling period or from which machine the large loss came if more than one machine is connected to any one sewer. A fiber analysis of the material lost is often helpful in determining its source.

There are a large number of records such as suction couch vacuum, power readings on beaters and jordans, pressure of stock in jordans, pressure on beater rolls and many others which may be kept. Which of these are worth while depends entirely on the type of papers being manufactured and the equipment available.

The question is often asked in regard to the use of automatic measuring and recording equipment. It is believed that this depends entirely on the individual mill and that an intelligent answer cannot be given until a study of the conditions as they exist in any particular mill is made. What would be suitable for one mill might be of no value to another.

Conclusion

In conclusion, an attempt has been made to describe from a practical operating viewpoint, a basis for technical beater room control. A more or less complete description of tests and measurements made on the pulp and other materials used in the beater room, a complete record of the beater furnishes including all changes made during a single order on the machine, a record of such determinations as the acidity, temperature, and freeness of the pulp as it goes onto the machine, and various tests on the tray water has been given. It is not believed that any single test or measurement in itself will solve any major beater room problem, but a practical, well developed control system is of great benefit in assuring a more uniform operation and resulting product. The actual value of this type of beater room control cannot be determined in actual dollars, but the accurate knowledge of what, both quantitative and qualitative, went into that product, together with the knowledge of how the product was manufactured, justifies any reasonable expense.

Effect of Alkalinity and Impurities on the Stability of Calcium Hypochlorite*

By C. M. Connor[1]

This study was undertaken to determine experimentally the stabilizing effect of excess alkali on commercially prepared calcium hypochlorite.

These results have been further supplemented by results of tests made on the same hypochlorite samples after about 100 days had elapsed. In these latter tests, conditions were varied to speed up the decomposition of all samples.

Procedure

A sample of commercially prepared and settled calcium hypochlorite was divided into five gallon portions for the tests. Sample 1 represents the bleach as prepared. The total alkali content is relatively low and thus the sample served as a basis for building up the lime content by the addition of commercial calcium hydrate. The lime was added in varying amounts as indicated in the tabulations resulting in samples of bleach covering a wide range of alkalinity. After the addition of the lime, the samples were intermittently agitated for 48 hours to insure uniform solution. After the first titration the samples were undisturbed for three months except for the regular analysis which was run once a week. The samples for titration were withdrawn at about the same depth in the bottle.

The bottles were covered to protect the contents from direct light and were tightly stoppered except when samples were withdrawn. The above conditions held from August 24th, 1936 until November 30th, 1936. The results of the titrations during this period are tabulated in Tables I to VI inclusive. Table XIV, XV, and XVI cover separate 1-liter samples, all being of the same strength and to which three grams of hydrate were added. These are reference samples and were checked at intervals to determine the accuracy of the methods used. The close correlation in each case appears to justify the feeling that any results obtained should be comparable.

From November 30th, 1936 to January 15th, 1937 Samples 1, 2, 4, and 6 inclusive were exposed to air which was bubbled through at a fairly uniform rate for periods of time indicated in the tabulations. Twelve hours prior to titration the bottles were thoroughly agitated and the air shut off. The liquor was of course completely settled in every case before the time for the drawing of the samples. The thought motivating the air treatment was that the liquor exposed to air in an open tank might contribute to the breakdown of the entire contents if mixed with the remainder, by pumping or other means. No effort was made to measure the quantity of air though the rate of flow through all the bottles was maintained the same during any period of exposure. The results of this study are tabulated in Tables VII to X inclusive.

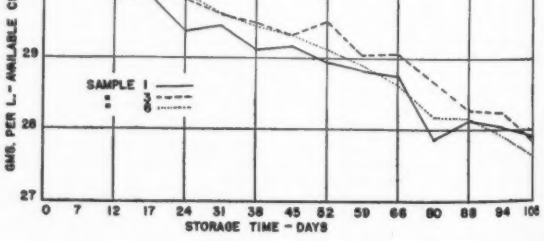
To determine the relative effects of the common impurities encountered in hypochlorite preparations, Samples 2, 4 and 6 were contaminated with C. P. magnesium chloride, ferric chloride and aluminum chloride. The air exposure treatment was continued

TABLE I—SAMPLE I
Total Volume—19 liters
Total Lime Added—None
GRAMS PER LITER

Date	Available Chlorine	Calcium Bicarbonate	Calcium Carbonate	Total Alkali as Calcium Oxide
8-17-36	30.95	.121	.15	.126
8-21-36	....	.121	.15	.126
8-24-36	30.39	.121	.15	.126
8-26-36	....	.040	.15	.098
8-29-36	29.86	.040	.15	.098
9- 3-36	29.89	.121	.05	.072
9-10-36	29.39	.113	.05	.067
9-17-36	29.46	.178	.05	.090
9-24-36	29.11	.105	.06	.070
10- 1-36	29.18	.21	.05	.10
10- 8-36	28.93	.113	.04	.063
10-15-36	28.83	...	...	...
10-22-36	28.75	.081	.05	.056
11- 2-36	....	.113	.03	.056
11- 5-36	27.87	.150	...	.053
11-13-36	28.11	.105	.03	.053
11-19-36	28.04	.073	.03	.042
11-30-36	27.90	.065	.05	.050

TABLE II—SAMPLE II
Total Volume—19 liters
Total Lime Added—5.22 grams
.274 grams per liter
GRAMS PER LITER

Date	Available Chlorine	Calcium Hydrate	Calcium Carbonate	Total Alkali as Calcium Oxide
8-24-36	30.4	.133	.37	.308
8-26-36	....	.139	.25	.235
8-29-36	29.89	.185	.20	.252
9- 3-36	29.99	.148	.20	.224
9-10-36	29.71	.111	.30	.252
9-17-36	29.54	.055	.40	.266
9-24-36	29.32	.111	.30	.252
10- 1-36	29.29	.044	.40	.257
10- 8-36	29.25	...	...	...
10-15-36	29.00	.099	.25	.215
10-22-36	28.79	.122	.22	.215
11- 2-36	....	.111	.20	.196
11- 5-36	28.75	.130	.20	.210
11-13-36	28.25	.092	.30	.238
11-19-36	28.22	.111	.25	.224
11-30-36	27.83	.092	.25	.210



TABLES 1, 3 AND 6
Lime added per L.: Sample 1, none; Sample 3, 55 Gms.; Sample 6, 2.95 Gms.

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Waldorf-Astoria Hotel, New York, N. Y., Feb. 21-24, 1938.
The report prepared for the Non-Fibrous Raw Materials Committee of the Technical Association of the Pulp and Paper Industry.
This investigation has been financed in part by the TAPPI Research Fund through the Committee on Educational Cooperation.
[1] Member TAPPI, Valley Forge Laboratories, Inc., West Conshohocken, Pa.

TABLE III—SAMPLE III

Total Volume—19 liters
Total Lime Added—10.45 grams
.55 grams per liter

GRAMS PER LITER

Date	Available Chlorine	Calcium Hydrate	Calcium Carbonate	Total Alkali as Calcium Oxide
8-24-36	30.40	.37	.41	.510
8-26-36	....	.41	.25	.448
8-29-36	30.07	.42	.20	.434
9- 3-36	30.25	.41	.25	.448
9-10-36	29.82	.37	.30	.448
9-17-36	29.61	.37	.50	.476
9-24-36	29.50	.33	.30	.420
10- 1-36	29.32	.31	.35	.434
10- 8-36	29.52	...	...	...
10-15-36	29.05	...	...	...
10-22-36	29.07	.39	.20	.406
11- 2-36	....	.37	.25	.420
11- 5-36	29.46	.35	.20	.378
11-13-36	28.29	.39	.20	.406
11-19-36	28.22	.37	.25	.420
11-30-36	27.83	.35	.25	.406
1-25-37	26.05	.35	.25	.406
4- 9-37	24.07	.37	.20	.392

TABLE IV—SAMPLE IV

Total Volume—19 liters
Total Lime Added—19 grams
1 gram per liter

GRAMS PER LITER

Date	Available Chlorine	Calcium Hydrate	Calcium Carbonate	Total Alkali as Calcium Oxide
8-24-36	30.40	.73	.39	.773
8-26-36	....	.77	.25	.721
8-29-36	30.28	.81	.20	.728
9- 3-36	30.18	.80	.25	.742
9-10-36	29.89	.76	.30	.742
9-17-36	29.61	.70	.45	.784
9-24-36	29.47	.72	.25	.686
10- 1-36	29.36	.70	.25	.672
10- 8-36	29.18	.63	.30	.645
10-15-36	29.04	...	...	...
10-22-36	28.83	.70	.25	.672
11- 2-36	....	.65	.30	.658
11- 5-36	....	.72	.20	.658
11-13-36	28.29	.72	.20	.658
11-19-36	28.22	.72	.20	.658
11-30-36	27.90	.72	.20	.658

TABLE V—SAMPLE V

Total Volume—19 liters
Total Lime Added—38 grams
2 grams per liter

GRAMS PER LITER

Date	Available Chlorine	Calcium Hydrate	Calcium Carbonate	Total Alkali as Calcium Oxide
8-24-36	30.40	1.24	.38	1.154
8-26-36	....	1.22	.25	1.064
8-29-36	30.21	1.26	.25	1.092
9- 3-36	30.10	1.22	.30	1.092
9-10-36	29.89	1.22	.30	1.092
9-17-36	29.61	...	...	...
9-24-36	29.47	1.26	.25	1.092
10- 1-36	29.32	1.22	.30	1.092
10- 8-36	29.11	1.22	.25	1.064
10-15-36	28.90	...	...	...
10-22-36	28.75	1.22	.25	1.064
11- 2-36	....	1.17	.25	1.023
11- 5-36	28.33	1.24	.20	1.050
11-13-36	28.12	1.22	.25	1.064
11-19-36	27.90	1.24	.20	1.050
11-30-36	27.69	1.24	.20	1.050
1-25-37	26.05	1.186	.30	1.060
4- 9-37	23.50	1.20	.20	1.020

TABLE VI—SAMPLE VI

Total Volume—19 liters
Total Lime Added—56.1 grams
2.95 grams per liter

GRAMS PER LITER

Date	Available Chlorine	Calcium Hydrate	Calcium Carbonate	Total Alkali as Calcium Oxide
8-24-36	30.40	...	...	...
8-26-36	....	1.31	.25	1.134
8-29-36	30.28	1.31	.25	1.134
9- 3-36	30.25	1.31	.30	1.162
9-10-36	29.89	1.31	.30	1.162
9-17-36	29.61	1.26	.45	1.204
9-24-36	29.46	1.32	.25	1.134
10- 1-36	29.32	1.22	.40	1.147
10- 8-36	29.11	1.26	.25	1.092
10-15-36	28.90	...	...	...
10-22-36	28.72	1.30	.23	1.105
11- 2-36	....	1.29	.25	1.105
11- 5-36	28.18	1.30	.20	1.092
11-13-36	28.16	1.31	.20	1.105
11-19-36	27.90	1.31	.20	1.105
11-30-36	27.62	1.28	.20	1.092

TABLE VII—SAMPLE I EXPOSED TO AIR

GRAMS PER LITER

Date	No. Hours Air Treatment	Available Chlorine	Calcium Bicarbonate	Calcium Carbonate	Total Alkali as Calcium Oxide
12- 7-36	3	27.09	.081	...	.028
12- 9-36	12	27.19	.056	.04	.042
12-10-36	19	27.40	.024	.08	.053
12-11-36	26	27.30	.032	.08	.056
12-15-36	40	....	.129	...	.044
12-17-36	53	27.15	.072	.03	.042
12-22-36	75	26.98	.105	...	.036
1- 5-37	107	26.51	.065	...	.022
1- 9-37	131	26.51	.056	...	.019
1-15-37	179	26.05	.024	...	.008
NO AIR TREATMENT—CONTAINER VENTED					
1-25-37	...	25.27	.016	...	.00056
4- 9-37	...	19.27	.008	...	.00028

TABLE VIII—SAMPLE II EXPOSED TO AIR

GRAMS PER LITER

Date	Total No. Hours Air Treatment	Available Chlorine	Calcium Hydrate	Calcium Carbonate	Total Alkali as Calcium Oxide
12- 7-36	3	27.58	.092	.25	.21
12- 9-36	12	27.76	.092	.25	.21
12-10-36	19	27.69	.111	.25	.22
12-11-36	26	27.54	.092	.25	.21
12-15-36	40	27.47	.129	.25	.238
12-17-36	53	27.37	.111	.25	.224
12-22-36	75	27.40	.093	.25	.210
1- 5-37	107	....	.111	.20	.196
1- 9-37	131	27.08	.111	.20	.196
1-16-37	179	27.12	.111	.20	.196

TABLE IX—SAMPLE IV EXPOSED TO AIR

GRAMS PER LITER

Date	Total No. Hours Air Treatment	Available Chlorine	Calcium Hydrate	Calcium Carbonate	Total Alkali as Calcium Oxide
12- 7-36	3	27.67	.666	.25	.645
12- 9-36	12	27.76	.666	.25	.645
12-10-36	19	27.76	.722	.25	.685
12-11-36	26	27.76	.574	.35	.630
12-15-36	40	27.47	.704	.25	.672
12-17-36	53	27.47	.685	.25	.658
12-22-36	75	27.47	.685	.25	.658
1- 5-37	107	27.15	.704	.20	.645
1- 9-37	131	27.19	.722	.20	.658
1-15-37	179	27.01	.685	.25	.658

TABLE X—SAMPLE VI EXPOSED TO AIR

GRAMS PER LITER

Date	Total No. Hours Air Treatment	Available Chlorine	Calcium Hydrate	Calcium Carbonate	Total Alkali as Calcium Oxide
12- 7-36	3	27.37	1.186	.30	1.064
12- 9-36	12	27.44	1.278	.25	1.105
12-10-36	19	27.30	1.278	.25	1.105
12-11-36	26	27.23	1.260	.25	1.092
12-15-36	40	27.17	1.260	.25	1.092
12-17-36	53	27.08	1.260	.25	1.092
12-22-36	75	27.02	1.220	.25	1.064
1- 5-37	107	26.69	1.278	.25	1.105
1- 9-37	131	26.76	1.278	.25	1.105
1-15-37	179	26.55	1.278	.25	1.105

TABLE XI—SAMPLE II

To which Magnesium Chloride (1.5 grams per liter) has been added. Exposure to air continued.

GRAMS PER LITER

Date	No. Hours Air Treatment	Available Chlorine	Calcium Bicarbonate	Total Alkali as Calcium Oxide
1-19-37	7	26.76	.202	.070
1-20-37	14	26.62	.081	.028
1-21-37	21	26.62	.061	.021
1-22-37	27	26.62	...	...
1-25-37	30	26.55	.061	.021
NO AIR TREATMENT—CONTAINER VENTED				
4- 9-37	..	21.65	.041	.014

TABLE XII—SAMPLE IV

To which Ferric Chloride (1.5 grams per liter) has been added. Exposure to air continued.

GRAMS PER LITER

Date	Total No. Hours Air Treatment	Available Chlorine	Calcium Bicarbonate	Calcium Carbonate	Total Alkali as Calcium Oxide
1-19-37	7	22.79	.081	.01	.084
1-20-37	14	19.88	.202	...	.126
1-21-37	21	18.76	.283	...	.097
1-22-37	27	16.11	.283	...	.097
1-25-37	30	12.28	.283	...	.098
NO AIR TREATMENT—CONTAINER VENTED					
4- 9-37	..	0.106	.243	...	.084

from January 19th to the 25th and titrations made each day. The results of this treatment will be found in Tables XI, XII, and XIII.

Conclusion

The results of the work on the effect of alkalinity on the stability of calcium hypochlorite in a closed vessel indicate that a total alkalinity expressed as calcium oxide of 0.1 gram per liter to 0.2 grams per liter is as effective as 1 gram per liter. This condition pertains even for a prolonged period.

The carbonate solubility of hypochlorite testing 30 grams per liter available chlorine, from these data is about 0.25 grams per liter regardless of total concentration. In those samples where the initial carbonate concentration approximated this value the change in the hydrate concentration was relatively slight as long as no air was introduced.

It appears that some hydrate concentration must be present to allow for carbonate solubility. When only carbonate and bicarbonate are present the carbonate concentration is very low and eventually diminishes to zero. Under these conditions the total alkali concentration also diminishes rapidly to a point at which only a low bicarbonate value exists. The hypochlorite under these conditions is still relatively stable.

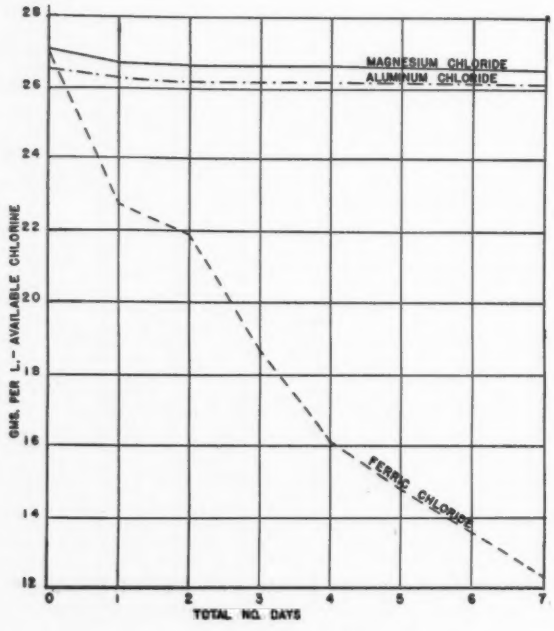
The effect of exposure to air on the alkali concentration is evidenced only on the sample of lowest alkalinity. Neither the hydrate concentration nor the carbonate concentration changed appreciably on exposure in the samples of high alkalinity. The hypochlorite stability was also unaffected by the exposure to air except in sample 1 of low alkalinity. The relative stability of the hydrate and carbonate concentration might be attributed to the excess lime originally added, which was present throughout the test period as sludge and which maintained an equilibrium. Though an analysis of the final sludge was not made, it would probably have shown a high carbonate content as compared with its initial hydrate-carbonate relation.

The effect of the metallic chlorides added to the samples is of interest.

Magnesium chloride neutralizes the hydrate and carbonate content; with a resulting formation of bicarbonate. The hypochlorite stability is affected only slightly by this reaction.

Ferric chloride results in similar alkalinity change but this change is accompanied by a drastic reduction in the hypochlorite strength. The often considered effect of iron on hypochlorite stability is therefore established, though the iron concentration was well in excess of any condition that would be encountered in practice. The reduction of alkali concentration of the iron plays an insignificant part in the decomposition of the hypochlorite, judging from results obtained on the magnesium chloride test.

Aluminum chloride at the concentration of 1.5 grams per liter has no effect on either the alkalinity or the hypochlorite decomposition rate. Consequently it would appear that the principle objection to alumina in the lime used for hypochlorite preparation is its effect on the clarification.



TABLES 11, 12, AND 13.

TABLE XIII—SAMPLE VI

To which Aluminum Chloride (1.5 grams per liter) has been added. Exposure to air continued.

		GRAMS PER LITER			
Date	Total No. Hours Air Treatment	Available Chlorine	Calcium Hydrate	Calcium Carbonate	Total Alkali as Calcium Oxide
1-19-37	7	26.27	1.00	.30	.924
1-20-37	14	26.19	.982	.25	.883
1-21-37	21	26.19	.925	.40	.924
1-22-37	27	26.19	.925	.40	.924
1-25-37	30	26.16	.925	.40	.924
	NO AIR TREATMENT—CONTAINER VENTED				
4- 9-37	..	24.15	1.03	.30	.952

TABLE XIV—REFERENCE SAMPLE I

With 3 grams per liter of Calcium Hydrate added.

		GRAMS PER LITER			
Date	Solution Temperature	Available Chlorine	Calcium Hydrate	Calcium Carbonate	Total Alkali as Calcium Oxide
8-26-36	78	....	...	..	....
8-29-36	77	27.76	1.38	.20	1.162
9- 3-36	75	....	1.33	.30	1.176
9-17-36	79	27.19	1.26	.40	1.176
9-24-36	78	....	1.27	.30	1.134
10- 1-36	79	26.76	1.22	.40	1.148
10- 8-36	78	....	1.26	.25	1.092
10-15-36	79	....	1.27	..	1.078
10-22-36	82	26.40	1.26	.30	1.020
11- 5-36	79	25.56	1.29	.20	1.092
11-19-36	80	25.52	1.29	.20	1.092
11-30-36	79	25.13	1.29	.20	1.092
1-25-37	79	23.29	1.24	.25	1.078
4- 9-37	80	21.44	1.13	.35	1.050

TABLE XV—REFERENCE SAMPLE II

With 3 grams per liter of Calcium Hydrate added.

		GRAMS PER LITER			
Date	Solution Temperature	Available Chlorine	Calcium Hydrate	Calcium Carbonate	Total Alkali as Calcium Oxide
7-26-36	78	....	...	..	....
7-29-36	77	28.04	1.39	.20	1.162
9- 3-36	75	....	1.33	.30	1.176
9-17-36	79	27.26	1.26	.40	1.176
9-24-36	78	....	1.29	.25	1.12
10- 1-36	79	27.05	1.18	.40	1.148
10- 8-36	78	....	1.27	.30	1.134
10-15-36	79	....	1.18	.35	1.092
10-22-36	82	26.63	1.18	.35	1.092
11- 5-36	79	26.10	1.22	.30	1.092
11-19-36	80	25.84	1.20	.30	1.078
11-30-36	79	25.56	1.22	.30	1.092
1-25-37	79	24.39	1.24	.25	1.078
4- 9-37	80	23.07	1.13	.25	.994

TABLE XVI—REFERENCE SAMPLE III

With 3 grams per liter of Calcium Hydrate added.

		GRAMS PER LITER			
Date	Solution Temperature	Available Chlorine	Calcium Hydrate	Calcium Carbonate	Total Alkali as Calcium Oxide
8-26-36	78	....	...	..	....
8-29-36	77	27.72	1.38	.20	1.162
9- 3-36	75	....	1.33	.35	1.204
9-17-36	79	27.40	1.26	.40	1.176
9-28-36	78	....	1.29	.25	1.120
10- 1-36	79	27.08	1.22	.40	1.148
10- 8-36	78	....	1.24	.30	1.105
10-15-36	79	....	...	..	....
10-22-36	82	26.86	1.24	.25	1.070
11- 5-36	79	26.27	1.24	.30	1.105
11-19-36	80	26.12	1.24	.30	1.105
11-30-36	79	25.91	1.22	.30	1.092
1-25-37	79	24.45	1.24	.30	1.05
4- 9-37	80	23.08	1.19	.25	1.05

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING SEPTEMBER 3, 1938

SUMMARY

Cigarette paper .....1,004 cs.
Wall paper .....24 bxs., 15 cs.
Newsprint .....20 bls., 6,001 rolls
Printing paper .....40 casks, 4 bls., 132 cs.
Wrapping paper .....3,627 rolls, 767 cs.
Kraft paper .....6 bls., 65 rolls
Filter paper .....26 cs.
Drawing paper .....24 cs.
Basic paper .....50 crates, 14 cs.
Surface baryta coated paper.....28 crates, 32 cs.
Surface coated paper .....52 cs.
Metal covered paper .....40 cs.
Transfer pictures .....11 cs.
Transfer paper .....25 cs.
Decalcomania paper .....10 cs.
Decalcomanias .....11 cs.
Tissue paper .....49 cs.
Wood pulp paper .....15 bls.
Paper tubes .....232 cs.
Crepe paper .....7 ctns.
Writing paper .....7 cs.
Blotting paper .....23 cs.
Miscellaneous paper.....100 pkgs., 1,657 rolls, 57 bls., 76 cs.

CIGARETTE PAPER

R. J. Reynolds Co., *Pr. Harding,* Havre, 113 cs.
American Tobacco Co., *De Grasse,* Havre, 409 cs.
Van Oppen & Co., *Exochorda,* Marseilles, 1 cs.
Champagne Paper Corp., *Champlain,* Havre, 481 cs.

WALL PAPER

American Express Co., *Kirishima Maru,* Kobe, 2 cs.
S. K. Lonegren, *Drottningholm,* Gothenburg, 4 bxs.
F. Blank & Co., *Manhattan,* Havre, 13 cs.
S. K. Lonegren, *Belos,* Wallvik, 20 bxs.

NEWSPRINT

Perkins, Goodwin & Co., *Hansa,* Hamburg, 192 rolls.
Jay Madden Corp., *Hansa,* Hamburg, 308 rolls.
Perkins, Goodwin & Co., *Pr. Harding,* Hamburg, 233 rolls.
N. Y. Evening Journal, *Pr. Harding,* Hamburg, 262 rolls.
Jay Madden Corp., *Pr. Harding,* Hamburg, 197 rolls.
N. Y. Evening Journal, *Markland,* Liverpool, N. S., 616 rolls.
N. Y. Tribune, *Markland,* Liverpool, N. S., 1,224 rolls.
World Telegram, *Markland,* Liverpool, N. S., 570 rolls.
Brooklyn Daily Eagle, *Markland,* Liverpool, N. S., 785 rolls.
Herald Statesman, *Markland,* Liverpool, N. S., 42 rolls.
International Paper Co., *G. T. D.,* Gatineau, 311 rolls.
——, *Stavangerfjord,* Skien, 20 bls.
Clinton Paper Co., *Drottningholm,* Gothenburg, 155 rolls.
Great Atlantic Paper Co., *Drottningholm,* Gothenburg, 84 rolls.
H. G. Craig Co., Inc., *G. D. D.,* Donnacona, 335 rolls.
N. Y. Evening Journal, *Manhattan,* Hamburg, 202 rolls.
Manufacturers Trust Co., *Manhattan,* Hamburg, 185 rolls.
International Paper Co., *International No. 1,* Gatineau, 300 rolls.

PRINTING PAPER

F. C. Strype, *Statendam,* Rotterdam, 8 cs.
——, *Statendam,* Rotterdam, 11 cs.
Dingelstedt & Co., *Hansa,* Hamburg, 29 cs., 40 casks.
Japan Paper Co., *Pr. Harding,* Havre, 9 cs.
Japan Paper Co., *Britannic,* London, 4 cs.
Kennelly Paper Co., Inc., *California,* Glasgow, 4 bls. (uncoated).
Dingelstedt & Co., *St. Louis,* Hamburg, 64 cs.
Steiner Paper Corp., *St. Louis,* Hamburg, 7 cs.

WRAPPING PAPER

A. Bleyer & Co., *Pr. Harding,* Hamburg, 897 rolls, 35 bls.
Gilson Bros., *Drottningholm,* Gothenburg, 283 rolls.
——, *Drottningholm,* Gothenburg, 1,695 rolls.
Jay Madden Corp., *Manhattan,* Hamburg, 667 rolls, 732 bls.
L. Glickman & Co., *Manhattan,* Bjorneborg, Finland, 85 rolls.

KRAFT PAPER

Wilkinson, Grey & Co., *Drottningholm,* Gothenburg, 6 bls., 65 rolls.

FILTER PAPER

H. Reeve Angel & Co., Inc., *Britannic,* London, 14 cs.
——, *Hansa,* Hamburg, 12 cs.

DRAWING PAPER

Keuffel & Esser Co., *Pr. Harding,* Hamburg, 16 cs.
H. Reeve Angel & Co., Inc., *Britannic,* London, 5 cs.
——, *St. Louis,* Bremen, 3 cs.

BASIC PAPER

Globe Shipping Co., *Hansa,* Hamburg, 50 crates.
Dingelstedt & Co., *Hansa,* Hamburg, 8 cs.
W. Bersch, *St. Louis,* Bremen, 6 cs.

SURFACE BARYTA COATED PAPER

Globe Shipping Co., *Hansa,* Hamburg, 10 cs., 36 crates.
Atlantic Forwarding Co., *Hansa,* Hamburg, 22 cs.

SURFACE COATED PAPER

Gevaert Co. of America, *Westernland,* Antwerp, 52 cs.

METAL COVERED PAPER

K. Pauli Co., *Hansa,* Hamburg, 30 cs.
K. Pauli Co., *Deutschland,* Hamburg, 10 cs.

TRANSFER PICTURES

Rohner Gehrig & Co., *Europa,* Bremen, 11 cs.

TRANSFER PAPER

Dingelstedt & Co., *Hansa,* Hamburg, 15 cs.
Lansen Naeve Co., *Hansa,* Hamburg, 1 cs.
Phoenix Shipping Co., *Deutschland,* Hamburg, 9 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *American Importer,* Liverpool, 10 cs.

DECALCOMANIAS

Sellers Transportation Co., *Europa,* Bremen, 11 cs.

TISSUE PAPER

Rohner Gehrig & Co., *Hansa,* Hamburg, 4 cs.
Corn Exchange Bank Trust Co., *Kirishima Maru,* Kobe, 23 cs.
Tricolator Co., *Kirishima Maru,* Kobe, 22 cs.

WOOD PULP PAPER

A. Giese Son, *Statendam,* Rotterdam, 15 bls.

PAPER TUBES

——, *Hansa,* Hamburg, 159 cs.
——, *Deutschland,* Hamburg, 73 cs.

CREPE PAPER

Phoenix Shipping Co., *Hansa,* Hamburg, 7 ctns.

WRITING PAPER

R. H. Macy & Co., *Manhattan,* Havre, 2 cs.
C. A. Redden, Inc., *Manhattan,* Havre, 1 cs.
American Express Co., *Manhattan,* Havre, 4 cs.

BLOTTING PAPER

American Express Co., *Manhattan,* Havre, 23 cs.

MISCELLANEOUS PAPER

Globe Shipping Co., *Hansa,* Hamburg, 1 cs.
Ensign Manufacturing Co., *Nagara Maru,* Yokohama, 10 cs.
H. Reeve Angel & Co., Inc., *Nagara Maru,* Yokohama, 9 cs.
Japan Paper Co., *Yamagiri Maru,* Kobe, 37 cs.
Remington Rand, Inc., *Yamagiri Maru,* Yokohama, 10 cs.
The Borregaard Co., Inc., *Drottningholm,* Gothenburg, 57 bls., 1,657 rolls, 100 pkgs.
T. N. Fairbanks, *Kiyokawa Maru,* Yokohama, 9 cs.

RAGS, BAGGINGS, ETC.

Hughes Fawcett, Inc., *Hansa,* Hamburg, 12 cs. flax waste.
Hoffman Lion Mills, *Kirishima Maru,* Osaka, 55 bls. rags.
Royal Manfg. Co., *Yamagiri Maru,* Kobe, 59 bls. rags.
D. M. Hicks, Inc., *Tonsbergfjord,* London, 37 bls. waste string.
———, *Tonsbergfjord,* London, 18 bls. rags.
W. Steck & Co., *Tonsbergfjord,* Antwerp, 248 bls. jute waste.
Chase National Bank, *Franconia,* Liverpool, 73 bls. bagging.
Manufacturers Trust Co., *Franconia,* Liverpool, 10 bls. rags, 3 bls. thread waste.
———, *American Importer,* Manchester, 17 bls. rags, 198 bls. paper stock.
———, *American Importer,* Liverpool, 93 bls. bagging.
Hughes Fawcett, Inc., *California,* Glasgow, 62 bls. flax waste.
Chase National Bank, *Express,* Algiers, 300 bls. rags.
Bolger Bros., *Black Falcon,* Rotterdam, 8 bls. bagging.
Darmstadt, Scott & Courtney, *Black Falcon,* Rotterdam, 235 bls. bagging.
Castle & Overton, Inc., *Black Falcon,* Rotterdam, 73 bls. bagging.
Chase National Bank, *Kiyokawa Maru,* Kobe, 100 bls. rags.
Globe Sanitary Rag Co., *Kiyokawa Maru,* Kobe, 40 bls. rags.
The Barrett Co., *Baalbek,* Hamburg, 153 bls. bagging.
Chase National Bank, *Stari Bolshevik,* Novorossisk, 10,217 bls. linters.
R. Blank, *Exochorda,* Alexandria, 144 bls. rags.
Irving Trust Co., *Exochorda,* Alexandria, 55 bls. bagging.
———, *Exochorda,* Alexandria, 147 bls. rags.
Castle & Overton, Inc., *Exochorda,* Alexandria, 85 bls. rags.
Banco Coml. Italiane Trust Co., *Exochorda,* Alexandria, 149 bls. bagging.
Chase National Bank, *Exochorda,* Alexandria, 23 bls. old cottons.
W. J. Green Co., Inc., *Exochorda,* Alexandria, 201 bls. rags.
W. Steck & Co., *Exochorda,* Alexandria, 93 bls. bagging.
E. J. Keller Co., Inc., *Exochorda,* ———, 65 bls. tares, 273 bls. rags, 77 bls. bagging.
———, *Exochorda,* Leghorn, 19 bls. rags.
Wertheimer Bag Co., *Fort Amherst,* Halifax, 115 bls. bagging.
Hughes Fawcett, Inc., *Deutschland,* Hamburg, 12 cases flax waste.

OLD ROPE

W. Steck & Co., *Cristobal,* Cristobal, 55 bls.
W. Steck & Co., *Statendam,* Rotterdam, 204 coils.
———, *Tonsbergfjord,* London, 113 coils.
National City Bank, *Westernland,* Antwerp, 53 coils.
Chase National Bank, *American Banker,* London, 84 coils.
Banco Coml. Italiane Trust Co., *American Banker,* London, 20 bls., 29 coils.
Banco Coml. Italiane Trust Co., *California,* Glasgow, 71 coils.
———, *California,* Glasgow, 55 coils.
Chase National Bank, *Black Falcon,* Rotterdam, 48 coils.
W. Steck & Co., *Giano,* Hull, 49 coils.
Chase National Bank, *Toronto City,* Bristol, 1,110 coils.
———, *Toronto City,* Bristol, 50 coils.

WOOD PULP

Bulkley, Dunton Pulp Co., Inc., *Statendam,* ———, 140 bls. wood pulp.
———, *Hansa,* Hamburg, 510 bls. wood pulp, 51 tons.
Absorbo Beer Pad Co., *Hansa,* Hamburg, 80 bls. wood pulp.
Perkins, Goodwin & Co., *Stavangerfjord,* Drammen, 125 bls. sulphite.
Chase National Bank, *Stavangerfjord,* Oslo, 600 bls. sulphite.
M. Sone, *Drottningholm,* Gothenburg, 126 bls. wood pulp.
———, *Belos,* Gefle, 125 bls. sulphite, 25 tons.
———, *Belos,* Hernosand, 300 bls. mechanical pulp, 50 tons.
Gottesman & Co., Inc., *Belos,* Iggesund, 1,125 bls. unbleached sulphate.
Perkins, Goodwin & Co., *Belos,* Sundsvall, 300 bls. sulphate, 50 tons, 300 bls. sulphite, 50 tons.
Bank of N. Y. Trust Co., *Deutschland,* Hamburg, 280 bls. wood pulp, 56 tons.
Guaranty Trust Co., *Deutschland,* Hamburg, 2,600 bls. unbleached sulphite, 520 tons.

WOOD PULP BOARDS

H. Fuchs & Son, *Drottningholm,* Gothenburg, 76 crates.
Fibre Case & Novelty Co., *Drottningholm,* Gothenburg, 14 bls.
Salwen Paper Co., *Drottningholm,* Gothenburg, 59 bls.
———, *Manhattan,* Hamburg, 30 bls.

NEWARK IMPORTS

WEEK ENDING SEPTEMBER 3, 1938

H. G. Craig Co., Inc., *Donpaco,* Donnacona, 353 rolls newsprint.

ALBANY IMPORTS

WEEK ENDING SEPTEMBER 3, 1938

Tradesman's Natl. Bank Trust Co., *Belos,* Wallvik, 500 bls. sulphate.
Pagel, Horton & Co., Inc., *Belos,* Gefle, 4,875 bls. sulphite, 531 tons; 1,550 bls. sulphate, 314 tons.
Stora Kopparberg Corp., *Belos,* Gefle, 615 bls. dry pulp, 124 tons.
———, *Belos,* Gefle, 500 bls. sulphite, 101 tons.
Gottesman & Co., Inc., *Belos,* Hernosand, 2,100 bls. unbleached sulphite.
Bank of New York Trust Co., *Belos,* Hernosand, 300 bls. sulphite, 50 tons; 300 bls. mechanical pulp, 50 tons.
———, *Belos,* Iggesund, 925 bls. sulphite.
Perkins, Goodwin & Co., *Belos,* Sundsvall, 1,200 bls. sulphite, 200 tons.
Gottesman & Co., Inc., *Belos,* Sundsvall, 6,210 bls. unbleached sulphite, 1,035 tons.
———, *Belos,* Sundsvall, 380 bdls., 2 cs. wallboard.
Price & Pierce, Ltd., *Tana,* ———, 2,035 bls. bleached sulphite.

NEW LONDON IMPORTS

WEEK ENDING SEPTEMBER 3, 1938

Pagel, Horton & Co., Inc., *Belos,* Sweden, 500 bls. wood pulp.
Price & Pierce, Ltd., *Belos,* ———, 150 bls. unbleached sulphate, 2,850 bls. unbleached sulphite.

BOSTON IMPORTS

WEEK ENDING SEPTEMBER 3, 1938

Price & Pierce, Ltd., *Tana,* ———, 750 bls. bleached sulphite.
Price & Pierce, Ltd., *Toronto,* ———, 750 bls. bleached sulphite.
Price & Pierce, Ltd., *Vingaren,* ———, 360 bls. bleached sulphite.

PHILADELPHIA IMPORTS

WEEK ENDING SEPTEMBER 3, 1938

———, *Tonsbergfjord,* London, 148 coils old rope.
Gottesman & Co., Inc., *Wanja,* Sweden, 600 bls. unbleached sulphite, 500 bls. bleached sulphite.
Price & Pierce, Ltd., *Wanja,* ———, 1,350 bls. unbleached sulphite.

CAMDEN IMPORTS

WEEK ENDING SEPTEMBER 3, 1938

Gottesman & Co., Inc., *Wanja,* Sweden, 3,000 bls. unbleached sulphite.

WILMINGTON IMPORTS

WEEK ENDING SEPTEMBER 3, 1938

Price & Pierce, Ltd., *Hjelmaren,* ———, 8,100 bls. unbleached sulphite.

BALTIMORE IMPORTS

WEEK ENDING SEPTEMBER 3, 1938

Washington Post, *Markland,* Liverpool, N. S., 1,664 rolls newsprint.
S. Shapiro & Son, *Kiyokawa Maru,* Kobe, 120 bls. rags.
Price & Pierce, Ltd., *Kelkheim,* ———, 600 bls. unbleached sulphate.

NORFOLK IMPORTS

WEEK ENDING SEPTEMBER 3, 1938

Price & Pierce, Ltd., *Wanja,* ———, 600 bls. unbleached sulphite.
Gottesman & Co., Inc., *Wanja,* Sweden, 8,053 bls. unbleached sulphite.

MONTREAL IMPORTS

WEEK ENDING SEPTEMBER 3, 1938

Price & Pierce, Ltd., *Idefjord,* ———, 2,100 bls. unbleached sulphite.

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, September 7, 1938.

The uptrend in both the production and distribution of many grades of paper and board continues during the current week. The Labor Day holiday had a considerable adverse effect upon industry and wholesale trade and when this factor is considered, the outlook for a substantial improvement by the middle of the month is highly encouraging.

For several weeks the index of general business activity has been slowly moving upward. At this date the revised index of general business activity, which is based upon five basic factors, such as car loadings, automobile production, etc., stands at 84.8 per cent, compared with 100 per cent for the corresponding period last year. The production ratio of over two hundred paper mills stands at 79.7 per cent for this week, against 77.8 per cent for the preceding week and compared with 83.3 per cent for the corresponding week last year.

The trend in demand for newsprint continues upward, though there is little change from the preceding week. Prices are firm and unchanged at prevailing market quotations.

The demand for some grades of sulphite papers is reported by the wholesale trade as a little improved during the week. The trend in demand is reported as upward, although the volume of practically all grades of white paper continues to be below expectations. Prices hold firm and are unchanged.

The trend in production and distribution of many grades of kraft paper continues upward and production and sales are substantially higher than are the figures reported for most grades of white paper. Prices on the more competitive grades of kraft, such as No. 1 and No. 2 wrapping papers, are somewhat unsatisfactory, due to the continuation of price making concessions in some quarters of the trade. Prices on other grades of kraft paper are reported as quite firm.

The production of box board continues upward and now stands at approximately 64 per cent, compared with 74 per cent for the corresponding week last year. Sales volume continues upward and the outlook in the box board division of the paper industry is encouraging. Prices on all grades of board are reported as quite firm.

Mechanical Pulp

The demand for mechanical pulp is reported as light. No change in prices are reported and no immediate change in the relatively low rate of activity in this market now prevailing is expected in the trade.

Chemical Pulp

The market situation in chemical pulp is unchanged from conditions prevailing for some time. In view of the ample supply generally reported in storage at the mills, there is little optimism expressed in the trade for the immediate future. In general, prices on all standard brands and grades of domestic and foreign pulps remain quite firm and no change in quotations has been reported for the current week. Reports are more or less frequently heard of price concessions being quoted below representative quoted market prices, but the trade does not consider these reports as of any particular significance.

Price cutting and rumors of underselling have been current in nearly all commodity and raw material markets. There are, of course, some cases where pulp has been sold at prices so low that profits have been virtually sacrificed. The report that southern kraft has been quoted at $30 per ton, delivered, is apparently an instance of this kind. If this quotation is for a standard or high quality grade it is obviously too low to give other than a scant profit to the producer, being $5 per ton under the representative quoted market price, which is currently quoted at a minimum of $35 per ton.

Old Rope and Bagging

The old rope market reports business as light. Prices continue quite firm and the trade is still expectant that manila rope prices will go somewhat higher in the future. Business in old bagging is reported as light. Prices are relatively firm and continue unchanged at prevailing quotations.

Rags

The demand for all grades of new and old domestic rags continues light. Prices remain quite firm, with only small lots being sold at under prevailing market prices. The foreign rag market is inactive and prices are strictly nominal.

Waste Paper

Little improvement in the market situation in waste paper is reported this week. Mill demand continues light and while an improvement is looked for in some quarters of the trade, no definite uptrend in mill demand is apparently in sight at this date. Reports of price reductions in some grades is reported but the only representative quoted reduction in price is on old kraft machine compressed bales which is currently quoted at from .75 to .80.

Twine

Demand for nearly all grades of hard and soft fiber twines is reported as under expectations for this week. A little more confidence is apparent in this market, however, and a large part of the trade expect prices to hold firm under a slowly improving demand.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, September 7, 1938.

BLANC FIXE—The prices of blanc fixe are reported firm and unchanged at prevailing market quotations. The pulp is quoted at from $42.50 to $45 per ton, in bulk; the powder is offered at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER — Quotations on bleaching powder are firm and continue unchanged at prevailing market prices. Bleaching powder is quoted at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The demand for casein is reported as fair for the current week. Prices are slightly higher for some grades. Domestic ground casein is quoted at from 10 to 10½ cents per pound; domestic finely ground at from 10½ to 11 cents per pound; all prices in bags, car lot quantities.

CAUSTIC SODA—Quotations on caustic soda continue firm and conform to prevailing market levels. Solid caustic soda is quoted at from $2.10 to $2.30 per 100 pounds; flake and ground at from $2.50 to $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—The prices of china clay are reported as firm and are unchanged at prevailing market quotations. Domestic filler clay is quoted at from $6.50 to $12 per ton; coating clay at from $11 to $22 per ton, at mines. Imported clay is quoted at from $14.50 to $25 per ton, ship side.

CHLORINE—Prices of chlorine continue firm at prevailing market quotations. Chlorine is quoted at $2.15 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The demand for rosin is reported as fair for the current week. Prices are lower. "G" gum rosin is quoted at $4.10; "FF" wood rosin at $4.10 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent gum rosin size is offered at $2.48 per 100 pounds, f.o.b., shipping point.

SALT CAKE—Prices of salt cake continue firm and conform to prevailing market levels. Quotations range at from $12 to $13.50 per ton; chrome salt cake at from $11 to $12 per ton, f.o.b., shipping point. Imported salt cake is quoted at from $14.50 to $15 per ton, Gulf or Atlantic Seaboard, on dock.

SODA ASH—Quotations on soda ash are firm and unchanged at prevailing market prices. Quotations on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.05; and in barrels, $1.35.

STARCH—The corn starch market is reported as quite firm. Prices are unchanged and conform to prevailing market prices. Globe pearl is quoted at $2.45 per 100 pounds, in bags, and at $2.70 in barrels. Special paper starch is quoted at $2.55 per 100 pounds, in bags, and at $2.80 in barrels. All prices in car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina continue firm and unchanged at prevailing market levels. The commercial grades are quoted at $1.15 per 100 pounds; iron free at $1.30 per 100 pounds, in barrels, car lot quantities, f.o.b., works.

SULPHUR—Quotations on sulphur are firm and conform to prevailing quotations. Annual contracts are quoted at $18 per long ton, f.o.b., cars at mines. Spot and nearby car lots are offered at $21 per ton.

TALC — Quotations on talc continue firm and unchanged at prevailing market levels. Domestic talc is quoted at from $15 to $18 per ton, Eastern mines. Imported talc is quoted at from $25 to $40 per ton, on dock.

Market Quotations

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	@	—
Kraft—per cwt.—Delivered Zone A			
No. 1 Northern	$5.25	@	—
Superstandard	4.12½	@	5.00
Northern Standard Wrapping	4.50	@	—
Standard Wrapping	4.00	@	—
Tissues—Per Ream—Carlots			
White No. 1	.92½	@	—
White No. 1 M. G.	.90	@	—
White No. 1½	.67½	@	—
White No. 2	.60	@	—
Anti-Tarnish M. G.	.75	@	—
Colored	.87½	@	—
Kraft	.75	@	—
Manila	.60	@	—
Unbl. Toilet, 1 M.	3.20	@	—
Bleached Toilet	5.26	@	—
Paper Towels—			
Unbleached	1.80	@	—
Bleached	2.10	@	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	$8.25	@	$9.75
No. 2 Jute	7.50	@	9.00
No. 1 Manila Wrapping, 35 lb.	5.00	@	—
No. 2 Manila Wrapping, 35 lb.	4.75	@	—
Boards, per ton—			
News	$27.50	@	$30.00
Chip	27.50	@	30.00
Sgl. Mla. Ll. Chip.	42.50	@	—
Jute Lined Chip	42.50	@	45.00
White Pat. Coated	55.00	@	57.50
Kraft Liners	42.50	@	50.00
Binders Boards	71.00	@	77.00

The following are representative of distributors' resale prices:—

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1.	$39.10	@ $46.00	$40.25	@ $47.25
100% Rag	31.05	@ 36.50	32.20	@ 37.75
85% Rag			29.90	@ 35.00
75% Rag	23.60	@ 27.75	24.75	@ 29.00
65% Rag			21.65	@ 26.25
50% Rag	17.55	@ 21.50	18.70	@ 22.75
25% Rag	14.65	@ 17.75	15.80	@ 19.25

Colors at $1.00 cwt. extra

Sulphite Bonds and Ledgers—White, Assorted Items.

Delivered in Zone 1:

	Bonds		Ledgers	
No. 1	$8.80	@ $10.75	$9.95	@ $12.00
No. 2	7.90	@ 9.50	9.05	@ 11.00
No. 4	7.00	@ 8.50	8.20	@ 10.00

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper.

Delivered in Zone 1:

No. 1 Glossy Coated	$10.80	@	$12.25
No. 2 Glossy Coated	9.25	@	10.50
No. 3 Glossy Coated	8.15	@	9.25
No. 4 Glossy Coated	7.65	@	8.75
No. 1 Antique (watermarked)	7.65	@	8.75
No. 2 Offset	7.00	@	8.00
A Grade E. F.	6.80	@	7.75
A Grade S. & S. C.	7.05	@	8.00
B Grade E. F.	6.25	@	7.25
B Grade S. & S. C.	6.50	@	7.50
C Grade E. F.	6.00	@	7.00
C Grade S. & S. C.	6.25	@	7.25
D Grade E. F.	5.70	@	6.75
D Grade S. & S. C.	5.95	@	7.00

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	25.00	@	30.00
Dry	26.00	@	30.00
(Delivered)			
No. 1 Domestic and Canadian	27.00	@	30.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	2.50	@	3.00
Prime Qualities—			
Easy-Bleaching Sulphite	2.15	@	2.25
Strong Unbleached Sulphite	1.85	@	2.15
(On Dock, Atlantic Ports)			
Kraft Bleached	2.75	@	3.00
Kraft Light & Strong	2.00	@	2.15
Kraft No. 1	1.85	@	2.00
Kraft No. 2	1.65	@	1.80
(F.o.b. Pulp Mill)			
Kraft Domestic	1.75	@	2.25
(Delivered)			
Soda Bleached	2.55	@	—

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1.	6.75	@	7.00
Silesias No. 1	4.00	@	4.25
New Unbleached	6.75	@	7.00
Blue Overall	5.50	@	5.75
Fancy	2.10	@	2.25
Washables	1.60	@	1.70
Mixed Khaki Cuttings	3.25	@	3.75
O. D. Khaki Cuttings	4.00	@	4.25

Old Rags

White, No. 1—			
Repacked	3.15	@	3.40
Miscellaneous	2.60	@	2.75
White, No. 2—			
Repacked	2.10	@	2.35
Miscellaneous	1.70	@	1.80
Thirds and Blues—			
Repacked	1.40	@	1.50
Miscellaneous	1.25	@	1.30
Roofing Rags—			
No. 1	1.00	@	1.10
No. 2	.85	@	.90
No. 3 (bagging)	.65	@	.70
No. 4	.65	@	.70
No. 5A	.65	@	.70

Foreign Rags

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	@	2.20
New Light Silesias	5.50	@	5.75
Light Flannelettes	5.50	@	5.75
New White Cuttings	7.00	@	7.50
New Light Oxford	4.00	@	4.50
New Light Prints	3.00	@	3.25

Old Rags

No. 1 White Linens	7.50	@	8.50
No. 2 White Linens	6.50	@	7.50
No. 3 White Linens	4.50	@	—

Let us take care of your REJECTIONS, over-runs or seconds.

We have branches in fourteen different cities and can sell your rejections for you at a minimum expense to you; wherever they occur.

THE SABIN ROBBINS PAPER COMPANY

STATION A CINCINNATI, OHIO

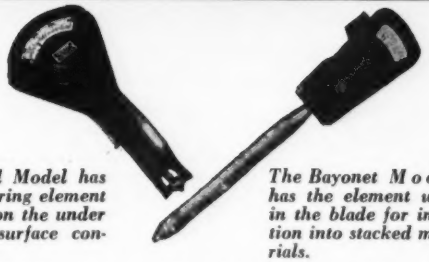
CLINTON STARCHES

Special Grades for Beater and Top Sizing

Manufactured by
CLINTON COMPANY
CLINTON, IOWA

QUALITY SERVICE

TWO INSTRUMENTS
FOR DETERMINING THE
MOISTURE CONTENT
OF HYGROSCOPIC MATERIALS



The Hand Model has the measuring element mounted on the under side for surface contact.

The Bayonet Model has the element within the blade for insertion into stacked materials.

These instruments are calibrated in percent relative humidity from 10% to 90% R.H. in the Hand Model and 20% to 80% in the Bayonet Type. Over the scale of the latter instrument a manually adjustable index pointer in addition to the humidity responsive pointer is used to mark a reference point, such as air humidity. This feature is a great convenience when taking comparative readings.

CAMBRIDGE INSTRUMENT CO., INC.
3732 Grand Central Terminal, New York, N. Y.

CAMBRIDGE MOISTURE INDICATORS
Send for descriptive literature

Pulp and Paper Mill Screens
Of Stainless Steel—Copper—Bronze—Monel—
Chemical Resisting Alloys
Perforations that are accurate in size

Any Metal Any Perforation

The Harrington & King PERFORATING Co.
5652 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N.Y.

FINEST CLAYS

IMPORTED **DOMESTIC**

PAPER MAKERS IMPORTING CO., INC. EASTON, PENNSYLVANIA, U.S.A.

DOMESTIC—TALC AND WHITING

No. 4 White Linens.	2.25	@	3.25
No. 1 White Cotton.	4.25	@	4.75
No. 2 White Cotton.	3.25	@	3.75
No. 3 White Cotton.	2.50	@	3.00
No. 4 White Cotton.	1.90	@	2.20
Extra Light Prints..	2.00	@	2.40
Ord. Light Prints...	1.75	@	2.15
Med. Light Prints...	1.55	@	1.95
Dutch Blue Cottons..	2.25	@	2.50
French Blue Linens..	3.00	@	—
Checks and Blues...	2.00	@	—
Linsey Garments....	1.90	@	2.00
Dark Cottons.....	1.50	@	1.60
Old Shopperies.....	1.30	@	1.45
New Shopperies.....	1.45	@	1.50
French Blues.....	2.25	@	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.40	@	2.50
Domestic	2.25	@	2.35
Wool Tares, light...	1.80	@	1.90
Wool Tares, heavy...	1.90	@	2.00
Bright Bagging.....	1.70	@	1.80
Manila Rope—			
Foreign	2.50	@	2.75
Domestic	2.50	@	2.75
Jute Threads.....	2.75	@	3.00
Sisal Strings.....	1.50	@	1.60
Mixed Strings.....	.60	@	.70

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.65	@	2.70
Ordinary Hard White No. 1....	1.90	@	2.00
Soft White No. 1..	1.75	@	1.80
Soft White Extra..	2.25	@	2.40
Flat Stock—			
Stitchless	.80	@	.85
Overissue Mag.....	.70	@	.75
Solid Flat Book...	.60	@	.65
Crumbled No. 1...	.40	@	.45
Ledger Stock White.	1.35	@	1.40
Ledger Stock Colored	.80	@	.90
New B. B. Chips....	.15	@	.20
Manila—			
New Env. Cut.....	1.40	@	1.50
New Cuttings.....	1.25	@	1.35
Old Kraft Machine—			
Compressed bales..	.75	@	.80
News—			
No. 1 White News	1.35	@	1.40
Strictly Overissue..	.50	@	.55
Strictly Folded....	.35	@	.40
No. 1 Mixed Paper..	.15	&	.20

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.11	@	.13
White Hemp.....	.12	@	.14
Fine Polished—			
Fine India.....	.15	@	.17
Unpolished—			
Box	.08½	@	—
Paper Makers.....	.07½	@	.08½
Tube Rope.....	.09	@	.10
Wall Paper.....	.10	@	.11
Wrapping	.11	@	.13
Soft Fiber Rope...	.09½	@	.11½
Cotton	.15	@	.20

(Hard Fiber)

Medium Java.....	.09	@	.10
Mex. Sisal.....	.08½	@	.09½
Manila	.18	@	.25
Domestic	2.25	@	2.50
Sisal Rope.....	1.65	@	1.85
Mixed Rope.....	.50	@	.75
Transmission Rope ..	1.75	@	1.90
Soft Jute Ropes.....	1.85	@	2.00
Jute Carpet Threads..	.75	@	.90
Gunny Bagging—			
Foreign	2.37½	@	2.40
Domestic	2.00	@	—
Bleachery Burlap....	3.25	@	3.62½
Scrap Burlap—			
Foreign	1.50	@	1.60
Domestic	1.35	@	1.40
Scrap Sisal	1.25	@	1.50
Scrap Sisal for Shredding	1.75	@	1.90
Wool Tares, Heavy..	1.50	@	1.60
New Burlap Cuttings	1.75	@	2.00
Aust. Wool Pouches.	2.75	@	3.10
Heavy baling bagging	2.00	@	—
Paper Mill Bagging..	1.00	@	1.15
No. 2 Bagging.....	.60	@	.70

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints...	.03¼	@	.03½
New White No. 1...	.06¾	@	.07
New Light Flannelettes	.04¼	@	.04¾
Silesias No. 1.....	.04¼	@	.04¾
New Black Silesias..	.03¾	@	.04
Silesias No. 1			
Soft Unbleached.....	.06¼	@	.06¾
Blue Cheviots.....	.05	@	.05¼
Fancy	.03	@	.03¾
Washable	.02¾	@	.03
Cottons—According to grades—			
Blue Overalls.....	.04½	@	.05
New Black, soft...	.03¾	@	.04
Khaki Cuttings....	.03¼	@	.03¾
D. D. Khaki.....	.04	@	.04½
Corduroy	.02¾	@	.03
New Canvas.....	.06¾	@	.07¼
B.V.D. Cuttings.....	—	@	.06½

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues.....	1.75	@	2.00
Old Blue Overalls...	1.50	@	—
Third and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings.....	3.90	@	4.00
Roofing Stock—			
No. 1.....	1.00	@	1.10
No. 2.....	.75	@	.85
No. 3.....	.65	@	.75

Foreign Rags

(F. o. b. Boston)

Dark Cottons	1.05	@	1.15
Dutch Blues.....	2.65	@	2.75
New Checks and Blues	2.85	@	3.00
Old Fustians.....	2.25	@	2.50
Old Linsey Garments	2.20	@	2.25
New Silesias.....	6.00	@	6.50

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1.	.06	@	.06¼
New White, No. 2.	.03½	@	.04
Light Silesias.....	.04	@	.04½
Silesias, No. 1....	—	@	.04½
Black Silesias, soft.	—	@	.03
New Unbleached..	.05½	@	.06
Washable, No. 1..	.01½	@	.01¾
Blue Overall.....	.04	@	.04½
Cottons—According to grades—			
Washable No. 2...	.01	@	.01¼
New Blue.....	.01	@	.01¼
Fancy Percales....	—	@	.02½
New Black Soft...	.03	@	.03½
New Light Seconds	—	@	.04½
New Dark Seconds	.50	@	.75
Khaki Cuttings—			
No. 1 O. D.....	.03	@	.03½
No. 2 Mixed.....	.02	@	.02½
Corduroy	—	@	.02
New Canvas.....	.05	@	.05½
New Black Mixed.	.02½	@	.02¾

Domestic Rags (Old)

White No. 1—			
Repacked	3.00	@	3.25
Miscellaneous	2.50	@	2.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.25
Repacked	1.50	@	1.75
Black Stockings (Export)	3.00	@	3.50
Roofing Stock—			
Foreign No. 1....	—	@	.75
Domestic No. 1...	—	@	1.00
Domestic No. 2...	—	@	.85
Roofing Bagging..	—	@	.70

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.50	@	1.75
Domestic	1.50	@	1.75
Manila Rope.....	3.00	@	3.25
Sisal Rope.....	—	@	1.75
Mixed Rope.....	.75	@	1.00
Scrap—			
No. 1.....	—	@	1.50
No. 2.....	1.00	@	1.25
Wool Tares, heavy..	3.25	@	3.50
Mixed Strings.....	1.00	@	1.10
No 1 New Light Burlap	2.50	@	3.00
New Burlap Cuttings	1.75	@	2.00

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White.	2.25	@	2.30
No. 2 Hard White.	2.00	@	2.10
No. 1 Soft White..	1.80	@	1.90
No. 2 Soft White..	1.30	@	1.40
No. 1 Mixed.....	.70	@	.75
Solid Ledger Stock..	1.50	@	1.60
Ledger Stock, white.	1.20	@	1.25
Ledger Stock, colored	.75	@	.80
No. 1 Books, heavy..	.65	@	.70
Manila Cuttings.....	1.50	@	1.75
Print Manila.....	.40	@	.45
Container Manila....	—	@	.40
Kraft Paper.....	.85	@	.90
No. 1 Mixed Paper..	.20	@	.25
Straw Board Chip...	.25	@	.30
Binders Board Chip.	.25	@	.30
Corrugated Board...	.50	@	.55
Overissue News.....	.50	@	.55
Old Newspapers.....	.35	@	.40

BOSTON

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White..	1.85	@	4.15
No. 2 Mixed.....	.75	@	.80
Solid Ledger Books..	1.50	@	1.75
Overissue Ledger Stock	1.30	@	1.50
Mixed Ledgers.....	.85	@	.90
No. 1 Books, heavy..	.65	@	.75
No. 1 Books, light...	.65	@	.75
Crumpled Stitchless Book Stock.....	.55	@	.65
Manila Env. Cuttings	1.60	@	1.70
Manila Envelope Cuttings, extra quality.	2.00	@	2.10
No. 1 Old Manila...	.95	@	1.00
White Blank News..	1.30	@	1.40
No. 1 Kraft.....	.90	@	1.00
Mixed Papers.....	.15	@	—
Print Manila.....	.45	@	.55
Container Manilas...	.27½	@	—
Old Newspapers.....	.25	@	.32½
Paper Wool Strings..	.80	@	—
Overissue News.....	.45	@	.50
Box Board Chips....	.20	@	.25
Corrugated Boxes...	.30	@	.32½
Kraft corrugated boxes	.65	@	.70
Screening Wrappers..	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	2.75	@	2.80

CHICAGO

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings....	1.80	@	1.90
No. 1 Hard White.	1.70	@	1.80
No. 1 Soft White..	1.50	@	—
Ledger & Writings..	.75	@	.80
Solid Books.....	.55	@	—
Blanks	.90	@	—
Krafts	.60	@	—
New Kraft Cuts.....	1.10	@	—
Manila Env. Cuts...	Nominal		
Ex. No. 1 Manila...	Nominal		
Print Manila.....	Nominal		
Overissue News.....	.35	@	—
Old Newspapers—			
No. 1 Folded News	.30	@	—
No. 1 Mixed Paper	.20	@	—
Roofing Stocks—			
No. 1.....	2.00	@	2.10
No. 2.....	1.85	@	1.90

TORONTO

Paper

Bonds and Ledgers

Delivered

No. 1 White	.36½	@	—
No. 1 Tints	.37½	@	—
No. 2 White	.26½	@	—
No. 2 Tints	.27½	@	—
No. 4 White	—	@	.1550
No. 4 Tints	16.50	@	—
No. 5 Bond—White	11.85	@	—
No. 5 Bond—Tints	12.85	@	—
No. 5 Bond—Golden Rod	13.35	@	—
No. 5 Ledger—White	.1185	@	—
No. 5 Ledger—Tints.	.1285	@	—
No. 6 Bond—White	10.75	@	—
No. 6 Bond—Tints.	11.25	@	—
No. 6 Bond—Golden Rod	12.75	@	—
No. 7 Bond—White .	9.10	@	—
No. 7 Bond—Tints .	9.60	@	—
No. 7 Bond—Golden Rod	11.10	@	—
Book—			
No. 1 M. F.	7.35	@	—
No. 2 M. F.	6.85	@	—
No. 3 M. F.	5.60	@	—
No. 1 S. C.	7.60	@	—
No. 2 S. C.	7.10	@	—
No. 3 S. C.	6.10	@	6.35
No. 1 Coated Book and Litho 12.50		@	—
No. 2 Coated Book and Litho 11.00		@	—
No. 3 Coated Book and Litho 10.00		@	—
Coated tinted.....13.50		@	—
Wrapping—delivered—			
Rag Brown.....	4.85	@	5.55
White Wrap.....	4.00	@	—
"B" Manila.....	4.90	@	6.25
No. 1 Manila.....	5.50	@	7.00
Fiber	5.50	@	—
Kraft No. 2.....	5.50	@	—

(F. o. b. Cars, Toronto)

News per ton—			
Rolls (contract)..$50.00		@	—
Sheets 69.50		@	—

Pulp

Ground wood.....29.00		@	—
Unbleached Sulphite..49.00		@	—
Book (Class 1).....59.00		@	—
Writing (Class 2)...57.00		@	—
Select (Class 3).....58.00		@	—
Kraft 50.00		@	—
Soda 54.00		@	56.00

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut...	2.25	@	—
Soft White.....	2.15	@	—
White Blk. News..	1.25	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	.80	@	—
Light and Crumpled Book Stock.	.70	@	—
Ledgers and Writings	1.10	@	—
Manilas—			
New Manila Cut...	1.35	@	—
Printed Manilas...	.45	@	—
Kraft	.95	@	—
News and Scrap—			
Strictly Overissue.	.50	@	—
Strictly Folded....	.45	@	—
No. 1 Mixed Paper..	.30	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.06½	@	.06¾
Fancy Shirt Cuttings	.02½	@	.02¾